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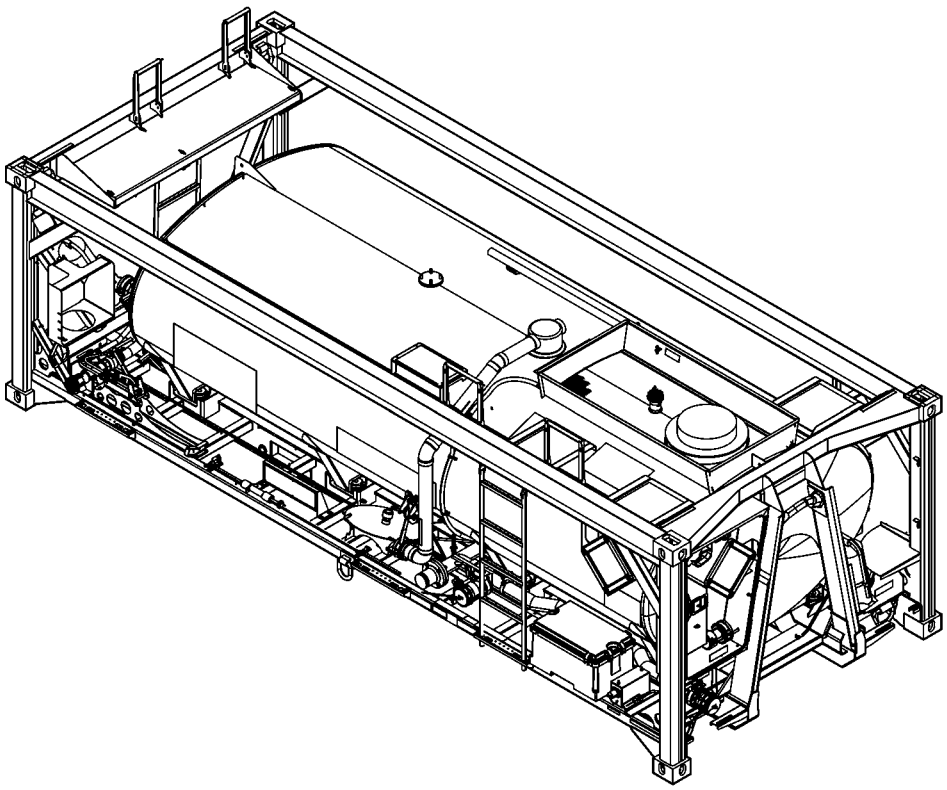
TECHNICAL MANUAL

OPERATOR AND FIELD MAINTENANCE MANUAL
INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL)

FOR

MODULAR FUEL SYSTEM TANK RACK MODULE
NSN 4930-01-517-6939 (EIC: TBD)



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HEADQUARTERS, DEPARTMENT OF THE ARMY
MAY 2010

WARNING SUMMARY

This warning summary contains general safety warnings and hazardous materials warnings that must be understood and applied during operation and maintenance of this equipment. Failure to observe these precautions could result in injury or death to personnel. Also included are explanations of safety and hazardous materials icons used with this technical manual.

FOR INFORMATION ON FIRST AID, REFER TO FM 4-25.11.

EXPLANATION OF SAFETY WARNING ICONS

ELECTRICAL - electrical wire to arm with electricity symbol running through human body shows that shock hazard is present.

EYE PROTECTION - person with goggles shows that the material will injure the eyes.

FIRE - flame shows that a material may ignite and cause burns.

FLYING PARTICLES - arrows bouncing off face with face shield show that particles flying through the air will harm face.

HEAVY OBJECT - human figure stooping over heavy object shows physical injury potential from improper lifting techniques.

HEAVY PARTS - heavy object on human figure shows that heavy parts present a danger to life or limb.

HOT AREA - hand over object radiating heat shows that part is hot and can burn.

SLICK FLOOR - wavy line on floor with legs prone shows that slick floor presents a danger from falling.

GENERAL SAFETY WARNING DESCRIPTION

WARNING

LIFTING ARM

Know the load limits of your lift before attempting to lift the TRM. Keep personnel at least 6 ft (2 m) away from the TRM being raised. Failure to comply could result in injury or death to personnel.

WARNING

MANHOLE COVER

Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge. Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face. Failure to comply could result in injury or death to personnel.

WARNING

SLIPPERY SURFACE

Wet metal surfaces are slippery. Use caution when climbing on tank. Failure to comply could result in injury or death to personnel.

WARNING

UNUSUAL ENVIRONMENTAL/WEATHER

- When operating the TRM in temperatures of 100ºF (38ºC) or higher, take extra care to minimize the possibility of an explosion and fire.
- Fuels evaporate very quickly. Fuel contact of skin can quickly lower the temperature of exposed skin making the area susceptible to frost bite. Prevent leakage of fuel onto bare skin of personnel.
- When operating the TRM in temperatures down to -25ºF (-31ºC), take extra care to minimize the possibility of frostbite to personnel.
- Failure to comply could result in injury or death to personnel.

EXPLANATION OF HAZARDOUS MATERIALS ICONS

BIOLOGICAL - abstract symbol bug shows that a material may contain bacteria or viruses that present a danger to life or health.

CHEMICAL - drop of liquid on hand shows that the material will cause burns or irritation to human skin or tissue.

CRYOGENIC - hand in block of ice shows that the material is extremely cold and can injure human skin or tissue.

EXPLOSION - rapidly expanding symbol shows that the material may explode if subjected to high temperatures, sources of ignition, or high pressure.

HIGH-PRESSURE FLUID - high-pressure fluid spraying human hand shows that fluid escaping under great pressure can cause injury or death.

RADIOACTIVE - identifies a material that emits radioactive energy and can injure human tissue or organs.

VAPOR - human figure in a cloud shows that material vapors present a danger to life or health.

HAZARDOUS MATERIALS DESCRIPTION

WARNING

BATTERIES

- Goggles, gloves, and apron must be worn whenever maintenance on batteries is being performed. Do not smoke, use open flame, make sparks, or create other ignition sources around batteries. Remove all jewelry such as rings, ID tags, watches, bracelets, and neck chains. If jewelry or a tool contacts a battery terminal, a direct short could result in instant heating or electrical shock.
- Do not overfill the battery. Too much electrolyte can cause excess pressure in the battery and cause battery acid to overflow through the vents releasing harmful fumes into the air.
- Sulfuric acid contained in batteries can cause serious burns. If battery corrosion or electrolyte makes contact with skin, eyes, or clothing, take immediate action to stop the corrosive burning effects as follows:
  - External: Immediately flush with cold running water to remove all acid.
  - Eyes: Flush with cold water for at least 15 minutes. Seek immediate medical attention.
  - Internal: Drink large amounts of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Seek immediate medical attention.
  - Clothing or Equipment: Wash at once with cold water. Neutralize with baking soda or household ammonia solution.
- Failure to comply could result in injury or death to personnel or damage to equipment.

WARNING

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, NUCLEAR

In the event equipment has been exposed to chemical, biological, radiological, and nuclear decontamination warfare, the equipment shall be handled with extreme caution and decontaminated in accordance with FM 3-11.5, NBC Decontamination. Unprotected personnel can experience injury or death if residual toxic agents or radioactive materials are present. If equipment is exposed to radioactive, biological, or chemical agents, personnel must wear protective mask, hood, protective overgarments, chemical gloves, and chemical boots in accordance with Mission Oriented Protective Posture (MOPP) level prescribed by the Officer In Charge (OIC) or Non-Commissioned Officer In Charge (NCOIC). MOPP analysis and levels are described in detail in FM 3-11.4, Multiservice Tactics, Techniques, and Procedures for NBC Protection. Personnel should contact a unit that has capability for freshwater wash down. The unit can also assist in the evacuation of soldiers who have been exposed and provide space and shelter for exchanging MOPP suits. Failure to comply could result in injury or death to personnel.

HAZARDOUS MATERIALS DESCRIPTION - CONTINUED

WARNING

FUEL

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Failure to comply could result in injury or death to personnel.

WARNING

SLAVE ASSISTING

- Use NATO slave cable that does not have loose or missing insulation.
- Do not proceed if suitable cable is not available.
- Do not use civilian-type jumper cables.
- Do no allow “dead” TRM and “live” vehicle come in contact with each other at any time during slave assisting/battery charging.
- Failure to comply could result in injury or death to personnel.

WARNING

SEALING COMPOUND

Goggles and gloves must be worn when working with sealing compound. Avoid contact with eyes and skin. Avoid breathing vapors and ensure there is adequate ventilation. If sealing compound contacts eyes, flush eyes with cold water for at least 15 minutes and seek immediate medical attention. If sealing compound contacts skin, wash skin thoroughly with soap and water. Failure to comply could result in injury to personnel.

HAZARDOUS MATERIALS DESCRIPTION - CONTINUED

WARNING

SOLVENT CLEANING COMPOUND

Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles, Use in well-ventilated areas. Keep away from open flames and other sources of ignition. Failure to comply may cause injury or death to personnel.

LIST OF EFFECTIVE PAGES/WORK PACKAGES

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Original.... 28 May 2010

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HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 28 May 2010

TECHNICAL MANUAL

OPERATOR AND FIELD MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL)

FOR

MODULAR FUEL SYSTEM TANK RACK MODULE NSN 4930-01-517-6939 (EIC: TBD)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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HOW TO USE THIS MANUAL

This manual contains certain features to improve the convenience of using this manual and increase the user's efficiency. These features include:

a. **Accessing Information.** This manual contains a Front Cover, Warning Summary, List of Effective Pages, Title Block Page, Table of Contents, Chapters 1 through 8, and an Alphabetical Index. Information is accessed by referring to Table of Contents, located in the front of this manual, or by looking in the Alphabetical Index, located in the back of the manual.

b. **Illustrations.** Various methods are used to locate, operate and repair or replace components. Locator illustrations in Controls and Indicator tables, PMCS tables, exploded views and cut-away diagrams make the information in the manual easier to understand and follow.

c. **Using This Manual.** When using this manual, read and understand the entire maintenance action before performing the task. Also, read and understand all warnings, cautions and notes, as well as general safety precautions that apply to the task to be performed. The warning summary will inform personnel of hazards associated with the equipment to be operated, maintained or repaired. However, the summary is not all-inclusive and personnel should be aware at all times of hazardous conditions that may arise.

Prior to starting the procedures in this manual, read the initial setup requirements located directly above each procedure. The information is given to ensure all materials, expendables, tools and any other equipment necessary are readily available for use. The initial setup will be accomplished prior to starting the actual steps of each operator or maintenance procedure.

LOCATING MAJOR COMPONENTS

Obtain the manual for the system to be operated, maintained or repaired. Turn to the Table of Contents located in the front of this manual. Find Chapter 1, General Information, Equipment Description and Theory of Operation. Under the chapter title you will find the work package titled Equipment Description and Data which contains Location and Description of Major Components. Turn to the work package indicated. The indicated work package will provide an illustration and brief description of each major components and its location.

OPERATING PROCEDURES

The Table of Contents may be used to locate operating procedures within this manual. To locate a particular operating procedure, open the manual to the Table of Contents located in the front of this manual. Locate Chapter 2, Operator Instructions. Under this section, locate the work package for the component you intend to operate. To the right of the operating procedure will be a work package number. Turn to the work package indicated and follow the steps to perform the procedure. The procedures indicate how to set up and operate the equipment. Follow the procedures indicated to complete the task.

At the top of the task, you will find a section entitled INITIAL SETUP. There are five basic headings listed under INITIAL SETUP.

a. **Tools and Special Tools.** Lists all tools (standard or special) required to perform the task. Tools are identified with an item number and table number from the applicable work package, located in Chapter 8, Supporting Information.

b. **Materials/Parts.** Lists all parts or materials necessary to perform the task. Expendable and durables are identified with an item number from the applicable work package located in Chapter 8, Supporting Information.

c. **Personnel Required.** Lists all personnel necessary to perform the task.

d. **References.** Include any other manuals necessary to complete the task. When there are no references listed, all steps necessary to complete the task are contained within this manual. A listing of reference materials is contained in the applicable work package in Chapter 8, Supporting Information.

e. **Equipment Condition.** Notes the conditions that must exist before starting the task. The equipment condition will also include any prerequisite maintenance tasks to be performed with reference to the work package number or the Technical Manual (TM) number.

TROUBLESHOOTING PROCEDURES

To locate a particular troubleshooting procedure, open the manual to the Table of Contents located in the front of this manual. Locate Chapter 3 or Chapter 5 Troubleshooting Procedures (Operator or Field Maintenance). Under this section, find a work package titled Master Malfunction/Symptom Index. Turn to the work package indicated, which lists all troubleshooting procedures. Review the list until you find the appropriate work package for the problem you intend to solve. To the right of the procedure will be a work package number. Turn to the work package indicated and follow the steps to complete the troubleshooting procedure. Each procedure lists the malfunction, symptom and the corrective action for the problem at hand. The corrective action will indicate which maintenance procedure to follow to alleviate the symptom or what level of maintenance is capable of correcting the problem. Follow the procedures indicated to complete the task. At the top of the task, you will find a section entitled INITIAL SETUP. There are five basic headings listed under INITIAL SETUP.

a. **Tools and Special Tools.** Lists all tools (standard or special) required to perform the task. Tools are identified with an item number and table number from the applicable work package, located in Chapter 8, Supporting Information.

b. **Materials/Parts.** Lists all mandatory replacement parts, expendable and durables necessary to perform the task. Expendable and durables and mandatory replacement parts are identified with an item number from the applicable work package located in Chapter 8, Supporting Information.

c. **Personnel Required.** Lists all personnel necessary to perform the task.

d. **References.** Include any other manuals necessary to complete the task. When there are no references listed, all steps necessary to complete the task are contained within this manual. A listing of reference materials is contained in the work package entitled References in Chapter 8, Supporting Information.

e. **Equipment Condition.** Notes the conditions that must exist before starting the task. The equipment condition will also include any prerequisite maintenance tasks to be performed with reference to the work package number or the TM number.

MAINTENANCE INSTRUCTIONS

To locate a maintenance procedure, open the manual to the Table of Contents located in the front of this manual. Locate the chapter that pertains to your level of maintenance: Chapter 4 for Operator Maintenance Instructions, or Chapter 6 for Field Maintenance Instructions. Look down the list and find the maintenance procedure to be accomplished. On the right side of the maintenance procedure will be a work package number. Turn to the work package indicated. Before beginning the maintenance task, look through the procedure to familiarize yourself with the entire maintenance procedure. At the top of the task you will have a section called INITIAL SETUP. There are five basic headings listed under INITIAL SETUP.

a. **Tools and Special Tools.** Lists all tools (standard or special) required to perform the task. Tools are identified with an item number and table number from the applicable work package, located in Chapter 8, Supporting Information.

b. **Materials/Parts.** Lists all mandatory replacement parts, expendable and durables necessary to perform the task. Expendable and durables and mandatory replacement parts are identified with an item number from the applicable work package located in Chapter 8, Supporting Information.

c. **Personnel Required.** Lists all personnel necessary to perform the task.

d. **References.** Include any other manuals necessary to complete the task. When there are no references listed, all steps necessary to complete the task are contained within this manual. A listing of reference materials is contained in the work package entitled References in Chapter 8, Supporting Information.

e. **Equipment Condition.** Notes the conditions that must exist before starting the task. The equipment condition will also include any prerequisite maintenance tasks to be performed with reference to the work package number or the TM number.

REPAIR PARTS AND SPECIAL TOOLS LIST

Refer to Chapter 8, Supporting Information when requisitioning parts, special tools and equipment.

Identify the mandatory repair parts required to perform the task listed at the top of the work package in the INITIAL SETUP. Using the reference provided, refer to the Mandatory Replacement Parts List work package in Chapter 8, Supporting Information. Using that part number, refer to the Part Number Index work package in this manual. Look up the part number in the part number column and identify the figure and item number where the part is located. Turn to the figure and locate the item number listed. Verify that the item is correct.

TORQUE VALUES

For torque not specified in an individual work package, refer to the Torque Limits Work Package located in Chapter 6 of this manual.

CHAPTER 1

GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION

OPERATOR AND FIELD MAINTENANCE

GENERAL INFORMATION

SCOPE

This manual contains descriptions and instructions for the Modular Fuel System Tank Rack Module, referred to as Tank Rack Module (TRM).

Type of Manual: Operator, Field Maintenance and Repair Parts.

Model Number and Equipment Name: Modular Fuel System Tank Rack Module.

Purpose of Equipment: The TRM is designed to be used by forward area petroleum personnel to receive, store, and dispense fuel.

MAINTENANCE FORMS, RECORDS AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 750-8, The Army Maintenance Management System (TAMMS) Users Manual.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your TRM needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you do not like about the equipment. Let us know why you do not like the design or performance. If you have Internet access, the easiest and fastest way to report problems or suggestions is to go to http://www.nslcptsmh.csd.disa.mil/webpqdr/webpqdr.htm. The Internet form lets you submit a Product Quality Deficiency Report (PQDR). You may also submit your information using an SF Form 368, Product Quality Deficiency Report. You can send your SF 368 via e-mail, regular mail, or facsimile directly to the U.S. Army TACOM Life Cycle Management Command. The postal mail address is U.S. Army TACOM Life Cycle Management Command, ATTN: AMSRD-TAR-E/PDQR, MS 268, 6501 E. 11 Mile Road, Warren, MI 48397-5000. The e-mail address is dami_tacomdrs@conus.army.mil. The fax number is DSN 786-5666 or Commercial 586-282-5666.

HAND RECEIPT (HR) MANUALS

There is no hand receipt manual for the TRM.

CORROSION PREVENTION AND CONTROL (CPC)

Corrosion Prevention and Control (CPC) of material is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.

Corrosion specifically occurs with metals. Corrosion is commonly caused by exposure to moisture, acids, bases, or salts, for example, the rusting of iron. Depending on the type of metal, corrosion damage is usually visualized as tarnishing, pitting, fogging, surface residue and/or cracking.

Plastics, composites and rubbers can also degrade. Degradation is caused by thermal (heat), oxidation (oxygen), solvation (solvents) or photolytic (light, typically UV) processes. The most common exposures are excessive heat or light. Damage from these processes will appear as cracking, softening, swelling and/or breaking.

If you experience any of these symptoms, submit form SF 368, Product Quality Deficiency Report, as outlined above.

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

The procedures for destruction of Army materiel to prevent enemy use are contained in TM 750-244-6, Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use.

PREPARATION FOR STORAGE OR SHIPMENT

The TRM provides limited space for the storage of accessory components. Accessory components such as suction hoses, discharge hose, and nozzles are stowed in enclosures mounted on the TRM. The tee assembly, ground rod, manhole transporter cover, fire extinguishers, and camlock adapter are stowed on the exterior of the TRM. The batteries are in an enclosure mounted on the exterior of the TRM.

The TRM components can be stored for periods of both short and long term. Short-term storage is defined as less than 180 days. Long-term storage is defined as longer than 180 days, and less than two years. All moving parts of the door locking mechanism, door hinges, document holder hinges and hasps, if not permanently lubricated, shall be lubricated with automotive grease semi-annually. The TRM should always be grounded while in storage. Preventive Maintenance Checks and Services (PMCS) should be performed when a module is removed from storage and prior to shipment.

Upon receipt of the TRM, and after all the system components have been unpacked and inventoried, perform PMCS. Inspect each component for damage that may have occurred during shipment or storage. Report any discrepancies on SF 364, Report of Discrepancy, in accordance with instructions given in DA PAM 750-8.

Refer to TRM Shipping and Storage Instructions (SSI).

LIST OF ABBREVIATIONS/ACRONYMS

Abbreviation/Acronym	Name
AR	Army Regulation
BII	Basic Issue Items
C	Celsius
CAGEC	Commercial and Government Entity Code
CBRN	Chemical, Biological, Radiological, and Nuclear
CBRNE	Chemical, Biological, Radiological, Nuclear, and Explosive
CCR	Closed Circuit Refueling
COEI	Components of End Item
cm	Centimeter
CPC	Corrosion Prevention and Control
CPR	Cardiopulmonary Resuscitation
CTA	Common Table of Allowances
DA	Department of the Army
DOT	Department of Transportation
DT	Desired Torque
EMI	Electromagnetic Interference
F	Fahrenheit
FGC	Functional Group Code
FM	Field Manual
ft	Foot
gal.	Gallon
gpm	Gallon Per Minute
HEMTT	Heavy Expanded Mobility Tactical Truck
HEMTT-LHS	Heavy Expanded Mobility Tactical Truck-Load Handling System
Hr	Hour

LIST OF ABBREVIATIONS/ACRONYMS – CONTINUED

Abbreviation/Acronym	Name
HR	Hand Receipt
IBCT	Interim Brigade Combat Team
ID	Identification
in.	Inch
in-lb	Inch Pound
JTA	Joint Table of Allowances
Lpm	Liter Per Minute
L	Liter
lb-ft	Pound-Foot
LEL	Lower Explosive Level
m	Meter
MAC	Maintenance Allocation Chart
MFS	Modular Fuel System
mm	Millimeter
MOPP	Mission Oriented Protective Posture
MTOE	Modified Table of Organization and Equipment
NATO	North Atlantic Treaty Organization
NBC	Nuclear, Biological, and Chemical
NCOIC	Noncommissioned Officer In Charge
Nm	Newton Meter
OC	On Condition
PLS	Palletized Load System
PMCS	Preventive Maintenance Checks and Services
PN	Part Number
psi	Pounds Per Square Inch
ROM	Refuel on the Move
RPSTL	Repair Parts and Special Tools List
SMR	Source Maintenance and Recoverability
SOP	Standard Operating Procedures
SPCC	Spill Prevention, Control, and Countermeasures
SSI	Shipping and Storage Instructions
TAMMS	The Army Maintenance Management System
TDA	Table of Distribution and Allowances
TEMP	Temperature
TM	Technical Manual
TMDE	Test, Measurement, and Diagnostic Equipment
TOE	Table of Organization and Equipment
TRM	Tank Rack Module

QUALITY OF MATERIAL

Material used for replacement, repair or modification must meet the requirements of this manual.

SAFETY, CARE, AND HANDLING

TRM may be used to store various fuels. It must be assumed that residual fuel and fuel vapors are present in TRM at all times, even after draining or purging. Therefore, equipment must always be handled with the same degree of caution as if it contained fuel. One or more fully charged fire extinguishers must be present at all times.

A static electric charge is always present in all fuels. Any physical movement of fuel will increase static charge, for example when fuel is being pumped, stirred, shaken or splashed. If charge is allowed to build sufficiently, it will discharge, causing a spark that may ignite fuel vapors. Buildup of a static electric charge is controlled by bonding and grounding of TRM. A ground rod and grounding cable are provided with TRM and must be inspected, maintained, and used consistently and conscientiously to prevent fuel ignition due to electrostatic discharge. The system should always be grounded except when being transported.

Fuels may contain toxic additives. Personal protective equipment should always be worn when working with TRM.

Fuels are dangerous under all conditions. Always observe fuel-handling safety precautions.

SUPPORTING INFORMATION FOR REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

For authorized common tools and equipment, refer to *Modified Table of Organization and Equipment (MTOE)*, CTA 50-970, *Expendable/Durable Items (Except: Medical, Class V, Repair Parts, and Heraldic Items)*, CTA 50-909, *Field and Garrison Furnishings and Equipment*, CTA 8-100, *Army Medical Department Expendable/Durable Items*, as applicable to your unit.

END OF WORK PACKAGE

OPERATOR AND FIELD MAINTENANCE

EQUIPMENT DESCRIPTION AND DATA

EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES

The TRM is used to receive, store, and issue fuel in selected units at division level and below. The initial use of the TRM is to provide mobile fuel storage and issuing capability for the Interim Brigade Combat Team (IBCT). The TRM fielded to the IBCT can be transported using a variety of configurations of Palletized Load System (PLS) trailers and trucks. Figure 1 illustrates some possible configurations. The TRM can be used to support relocation of forces by providing refuel-on-the-move (ROM) capability. The units requiring the TRM must possess the ability to rapidly change operational locations and provide petroleum products with minimum use of support assets. Each TRM can transport approximately 2,500 gal. (9,464 L) of fuel over all types of terrain. The flexibility of the system allows the fuel capacity to be tailored to the tactical mission requirement.

The PLS and the Heavy Expanded Mobility Tactical Truck (HEMTT) with the Load Handling System (LHS) are each capable of loading the TRM onto themselves or onto a PLS trailer. This self-load/-unload capability eliminates many of the logistical and planning problems associated with current fuel doctrine, such as having to wait while collapsible tanks or bulk tankers are filled.

The TRM provides the ability to rapidly establish fuel storage capability at any location without the use of material handling or construction equipment. A HEMTT-LHS or PLS can recover the TRM, transport it to a new location, and position the system upon arrival. An empty, full, or partially loaded TRM can be readied for transport, uploaded, and moved in a fraction of the time required for a collapsible tank. Operations can continue uninterrupted by replacing empty TRMs with full ones.

The TRM can also be used for line haul of bulk fuel throughout the theater. A PLS or HEMTT-LHS can transport two TRMs – one on the truck and one on the PLS trailer – for a total of up to 5,000 gal. (18,928 L) of bulk petroleum. The increased mobility and capability of the HEMTT-LHS and PLS allow direct delivery of bulk fuel to a brigade area. The truck unloads the full TRM in the required position and loads any empty TRM for transport back to the fuel resupply point. Although it cannot lift the TRM onto or off a PLS trailer, a HEMTT Fueler can tow a PLS trailer with the TRM to transport a total of 5,000 gal. (18,928 L).

The use of the HEMTT-LHS as the prime transporter results in increased cross-country mobility. This expanded capability is critical to uninterrupted resupply of fuel to maneuvering forces.

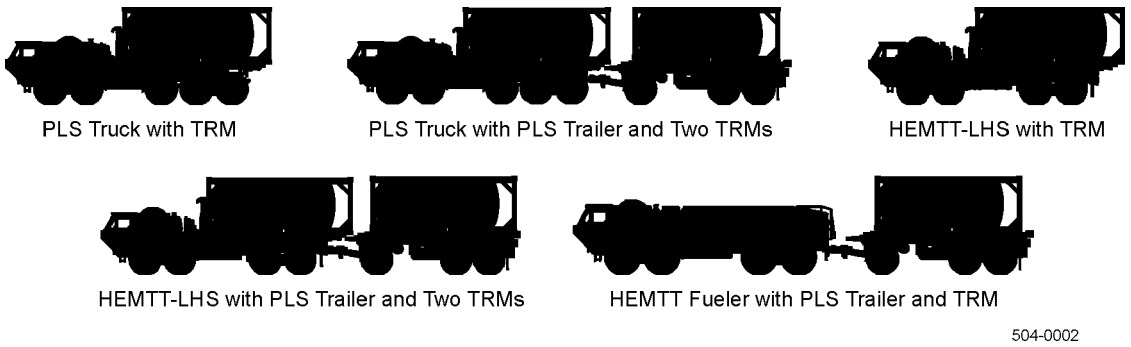

PLS Truck with TRM
PLS Truck with PLS Trailer and Two TRMs
HEMTT-LHS with TRM
HEMTT-LHS with PLS Trailer and Two TRMs
HEMTT Fueler with PLS Trailer and TRM
504-0002

Figure 1. TRM Transport Configurations.

END OF TASK

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

The TRM consists of the following major components:

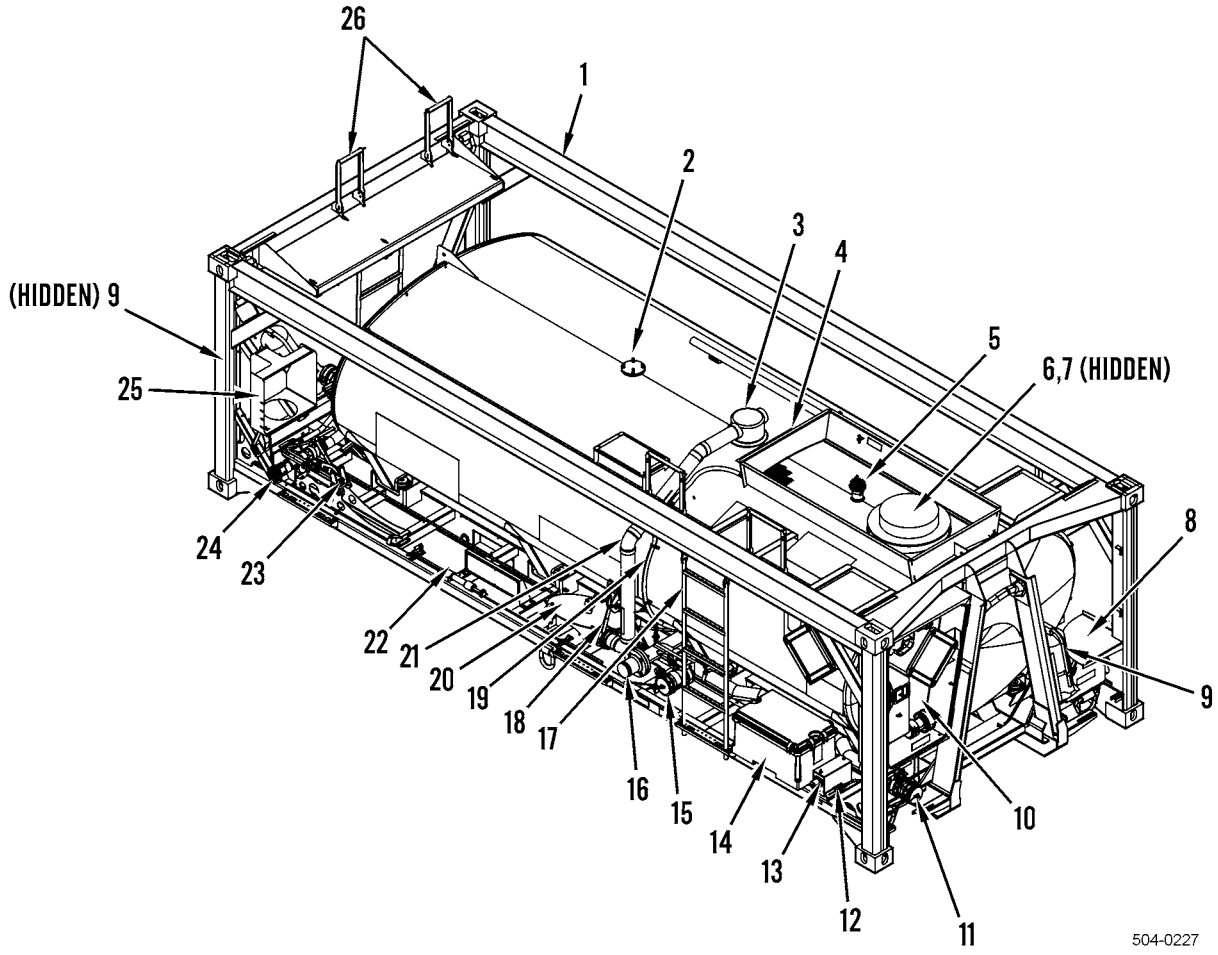


Figure 2. Tank Rack Module - Left Rear.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS – CONTINUED

Table 1. Tank Rack Module Major Components.

ITEM	DESCRIPTION	UOC	QTY
1	Tank Rack Module (TRM)		1
2	Fuel Tank Cover		1
3	Vent Hood		1
4	Spillbox		1
5	Non-Valved Dry Break (Top Fill Port)		1
6	Manhole Cover		1
7	Liquid Level Switch (Inside Manhole: see Figure 3)		1
8	Spill Kit Bracket		1
9	Fire Extinguisher		2
10	Tool Box		1
11	Discharge Piping (Port G)		1
12	Right Hand Emergency Shutoff Lever		1
13	NATO Slave Connector		1
14	Battery Box		1
15	Bottom Load Valve Piping Assembly (Port B)		1
16	Internal Valve (Port A) Single Point		1
17	ISO Rack Ladder		2
18	Side Mechanical Operator (V2)		1
19	Spillbox Drain Line		2
20	Transporter Cover		1
21	Vapor Recovery Piping Assembly		1
22	Ground Rod		1
23	Control Lever Assembly (V1)		1
24	Right Hand Discharge Arm (Port E)		1
25	Drip Pan Bracket		1
26	ISO Rack Handles		2

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS – CONTINUED

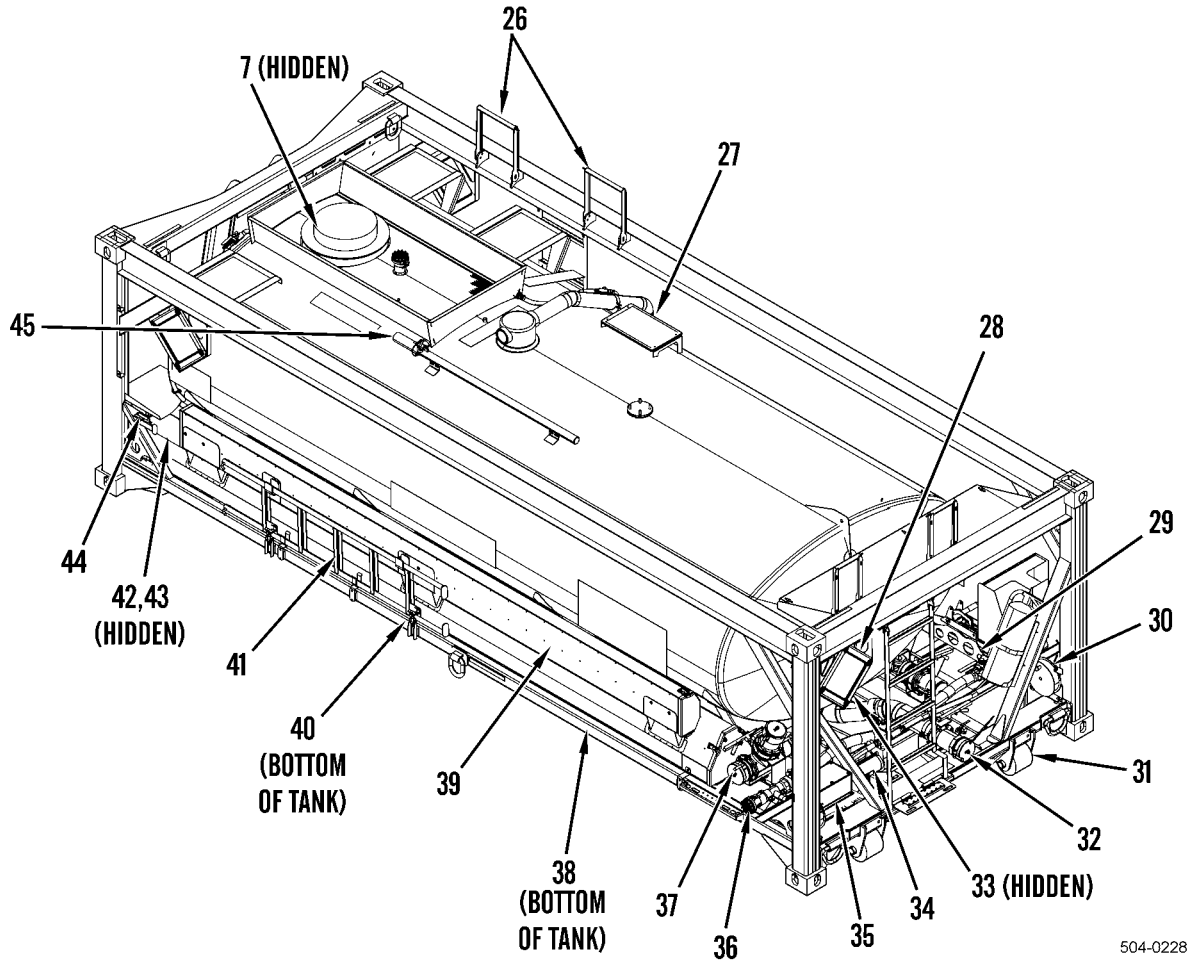


Figure 3. Tank Rack Module - Right Front.

Table 2. Tank Rack Module Major Components.

ITEM	DESCRIPTION	UOC	QTY
26	ISO Rack Handles		2
27	Battery Charger		1
28	Placard Holders		4
29	Camlock Adapter and Bracket		1
30	Static Ground Reels		2
31	Rollers		2
32	Discharge Piping Assembly (Port C)		1
33	Rear Head Tank Gauge		1
34	Fuel Pump Assembly		1
35	EMI Box		1
36	Left Hand Discharge Arm (Port D)		1
37	Tee Assembly and Bracket		1
38	V1 Valve (Bottom of Tank)		1
39	Hose Trough Assemblies with Suction Hoses		2

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS – CONTINUED

Table 2. Tank Rack Module Major Components - Continued.

ITEM	DESCRIPTION	UOC	QTY
40	V2 Valve (Bottom of Tank)		1
41	Ladder		1
42	Compression Springs		12
43	Isolation Mounts		16
44	Left Hand Emergency Shutoff Lever		1
45	Stowage Tube Assembly (Stows Gauge Stick)		1

EQUIPMENT DATA

Table 3 provides data pertaining to the operation and mechanical characteristics of components within the TRM.

Table 3. Tank Rack Module Specifications.

ITEM CHARACTERISTIC/ SPECIFICATION	DESCRIPTION
Capacity	2,500 gal. (9,464 L)
Weight	18,000 lb (8,164.66 kg) (Max Payload)
Empty	7,800 lb (3,538 kg)
With 2,500 gal. of fuel	25,800 lb (11,702 kg)
Height	6 ft (1.83 m)
Length	19 ft 11 in. (6.07 m)
Width	8 ft (2.44 m)

END OF TASK

TANK ASSEMBLY FILL CAPACITY

1. When the TRM is on level ground, with a fuel level 8 in. (20.3 cm) from lip of the manhole, the rear head indicator dial should read 2,500 gal. (9,464 L), which is nominal “full” capacity of TRM.
2. 2,500 nominal gal. (9,464 L) leaves 5% outage or 5 in. (12.7 cm) of air space, measured vertically from the top of the liquid to the inside of the top of the shell (Figure 4).

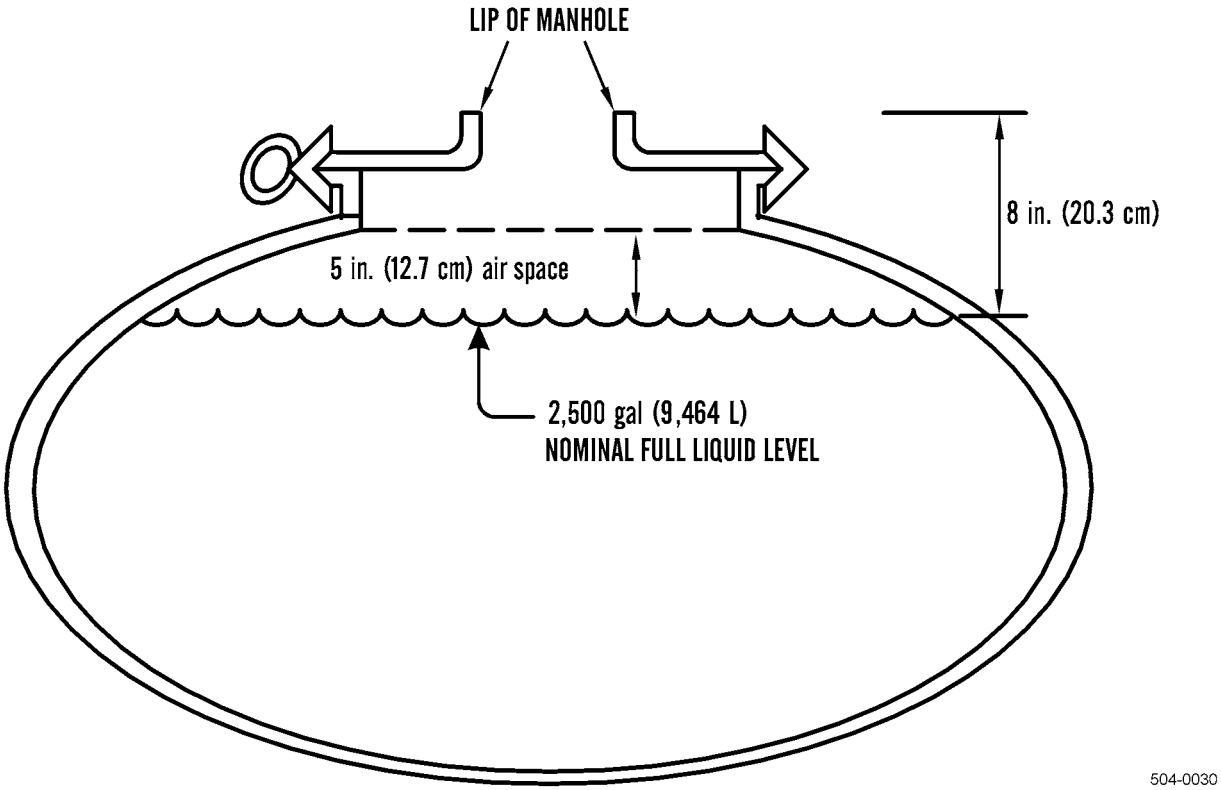


Figure 4. Tank Assembly Fill.

END OF TASK

END OF WORK PACKAGE

OPERATOR AND FIELD MAINTENANCE

THEORY OF OPERATION

INTRODUCTION

The TRM provides the ability to rapidly establish a fuel distribution and storage capability at any location, regardless of the availability of construction equipment or material handling equipment. A HEMTT-LHS or PLS can recover the TRM, transport it to a new location, and position the system upon arrival. An empty, full, or partially loaded TRM can be readied for transport, uploaded, and moved in a fraction of the time required for a collapsible tank.

The increased mobility and capability of the HEMTT-LHS and PLS allow direct delivery of bulk fuel to a brigade area. The truck off-loads the full TRM in the required position and loads empty TRMs for transport back to the fuel resupply point. The selected site does not require any preparation prior to deployment. The use of the HEMTT-LHS as the prime transporter results in increased cross-country mobility. This increased capability is critical to uninterrupted resupply to maneuvering forces. Operations can continue uninterrupted by replacing empty TRMs with full ones.

The TRM can also be used for line haul of bulk fuel throughout the theater. A PLS or HEMTT-LHS can transport two TRMs – one on the truck and one on the PLS trailer – for a total of up to 5,000 gal. (18,928 L) of bulk petroleum.

The TRM consists of an enhanced flat rack to provide the required interface with the HEMTT-LHS truck, PLS truck and PLS trailer. The TRM fittings, nozzles and other ancillary items are compatible with and are currently in inventory for various other fuel handling systems.

The TRM contains:

a. Storage for other equipment necessary for maintenance and refueling operations
b. Pressure relief valves
c. Load stabilization equipment (baffling, surge plates, etc., to minimize shifting of fuel during transport)
d. 2,500 gal. (9,464 L) storage tank with manhole to enter and exit the inside of the tank
e. Tank gauge viewable by a soldier standing on the ground
f. Piping manifold
g. Secure storage for hoses and nozzles
h. Electric pump, valves, and manifold for fuel distribution

END OF WORK PACKAGE

CHAPTER 2

OPERATOR INSTRUCTIONS

OPERATOR INSTRUCTIONS

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS

INTRODUCTION

The following tables and illustrations provide the description and use of the controls and indicators pertaining to the TRM.

TRM CONTROLS AND INDICATORS

Tables 1 thru 8 identify the controls and indicators of the TRM and describe their function.

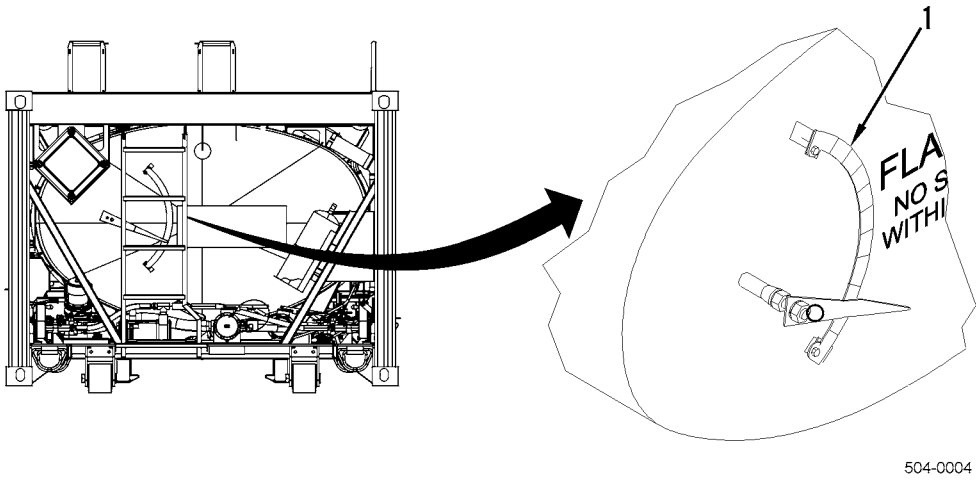


Figure 1. Rear Head Tank Gauge.

Table 1. Rear Head Tank Gauge Controls and Indicators.

KEY	CONTROL/INDICATOR	FUNCTION
1	Rear Head Tank Gauge	Indicates amount of fuel in tank.

NOTE

The amount of fuel in tank can also be determined by the gauge stick (WP 0016).

TRM CONTROLS AND INDICATORS – CONTINUED

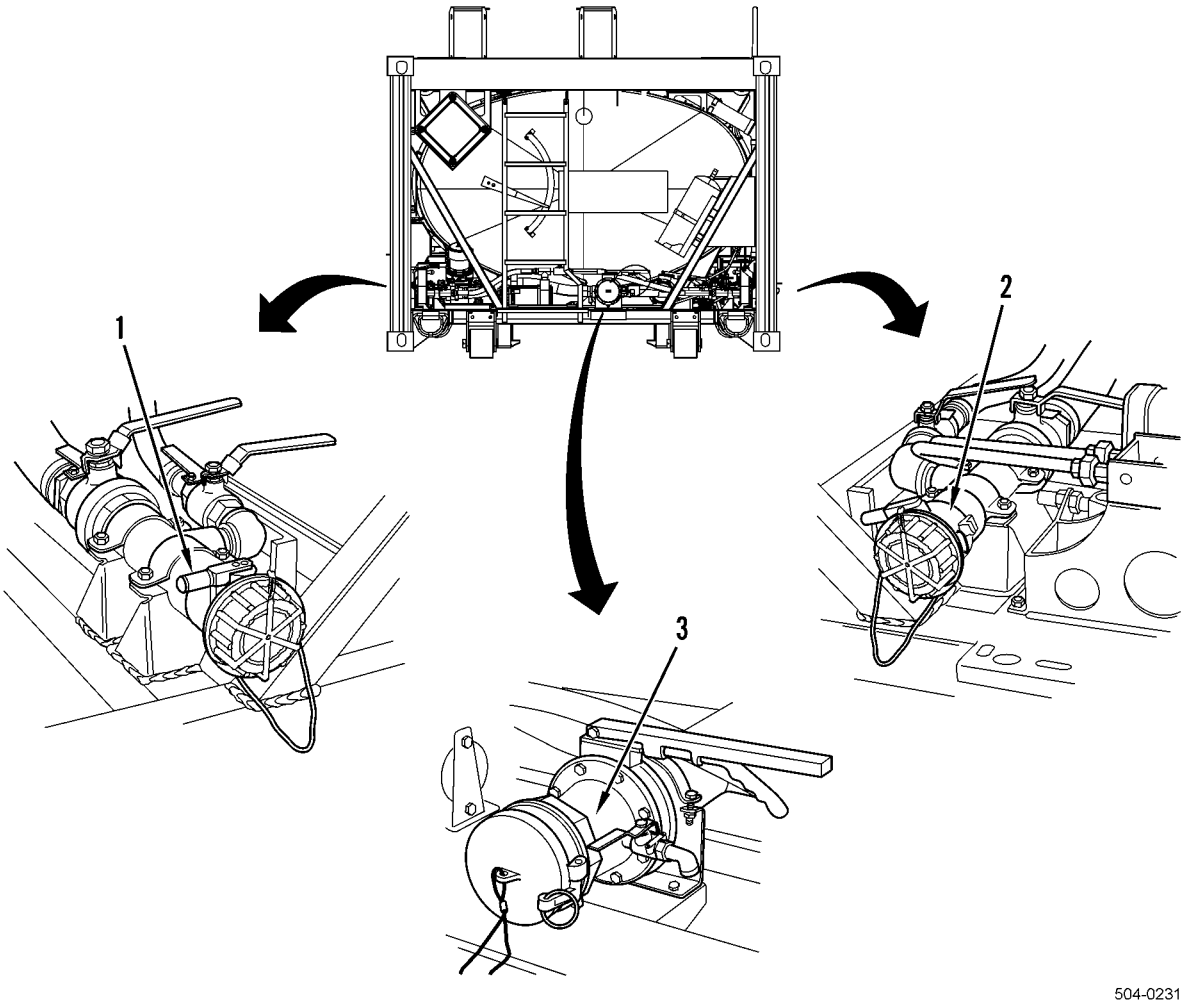


Figure 2. Discharge Piping Assembly.

Table 2. Discharge Piping Assembly Controls and Indicators.

KEY	CONTROL/INDICATOR	FUNCTION
1	Discharge Piping Assembly, Unisex, 2 in. (5.08 cm), roadside (Port D, V11)	Discharges fuel.
2	Discharge Piping Assembly, Unisex, 2 in. (5.08 cm), curbside (Port E, V12)	Discharges fuel.
3	Discharge Piping Assembly, 4 in. (10.16 cm), Butterfly Valve (Port C, V7)	Controls flow of fuel during bulk discharge operations.

TRM CONTROLS AND INDICATORS – CONTINUED

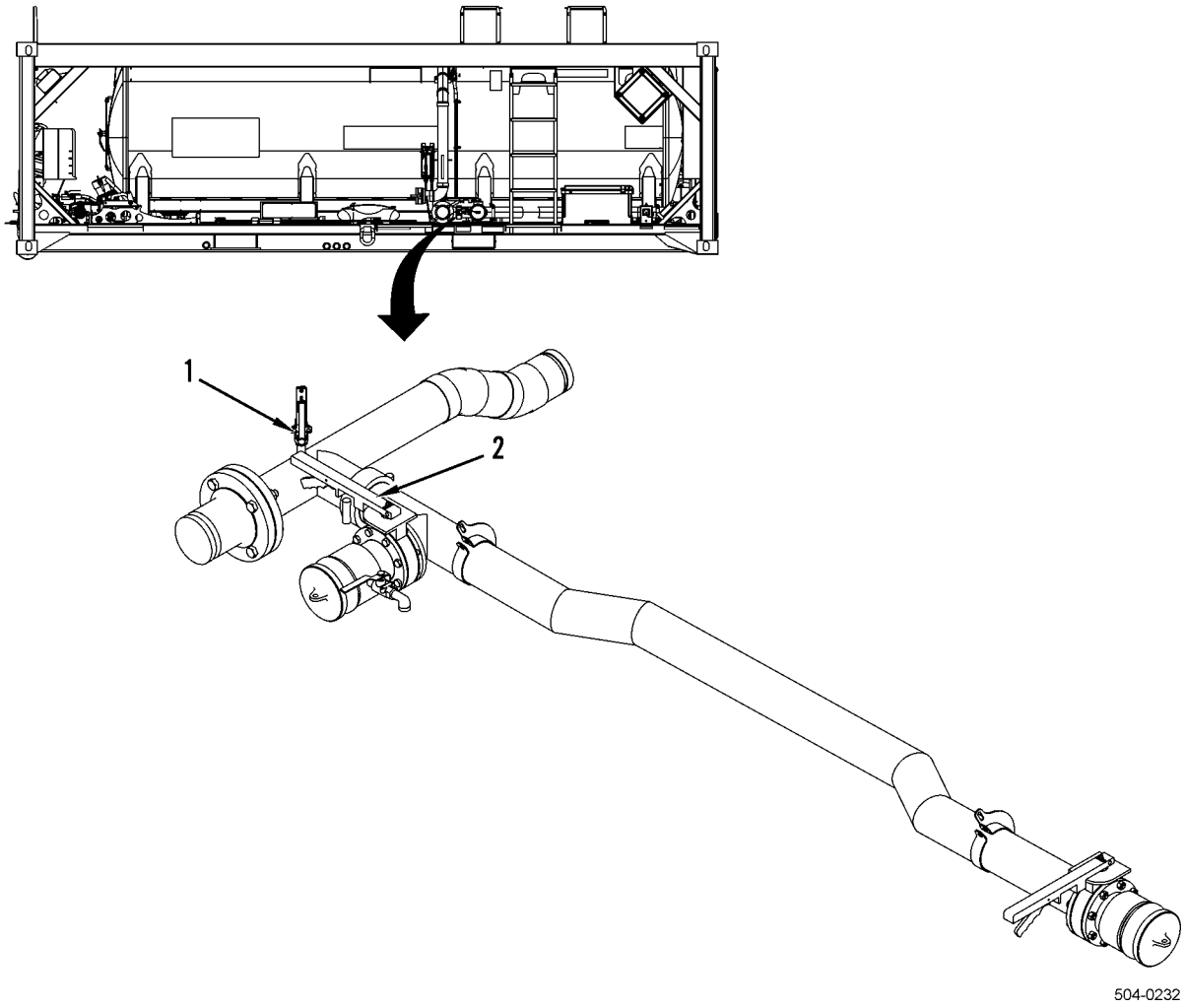


Figure 3. Inlet Piping Butterfly Valve and Precheck Ball Valve.

Table 3. Inlet Piping Butterfly Valve and Precheck Ball Valve Controls and Indicators.

KEY	CONTROL/INDICATOR	FUNCTION
1	Precheck Ball Valve (V6)	Controls flow of fuel to liquid level switch.
2	Butterfly Valve, Inlet Piping (V5)	Controls flow of fuel through bottom load inlet piping.

TRM CONTROLS AND INDICATORS – CONTINUED

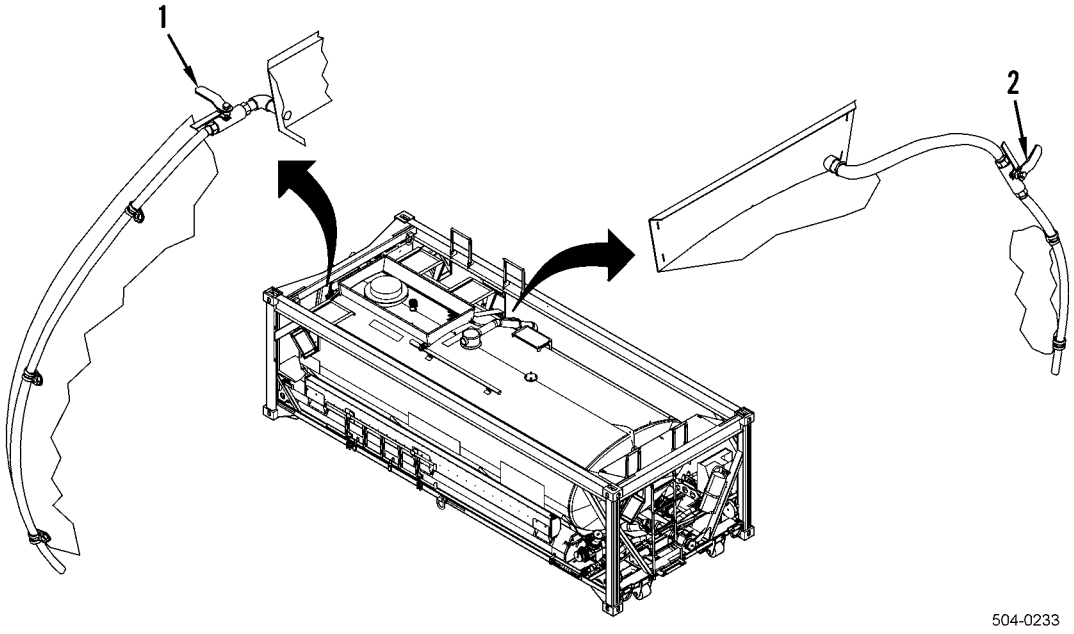


Figure 4. Spillbox Drain Valves.

Table 4. Spillbox Drain Valves Controls and Indicators.

KEY	CONTROL/INDICATOR	FUNCTION
1	Spillbox Front Drain Valve	Allows drainage of fuel in spillbox.
2	Spillbox Rear Drain Valve	Allows drainage of fuel in spillbox.

TRM CONTROLS AND INDICATORS – CONTINUED

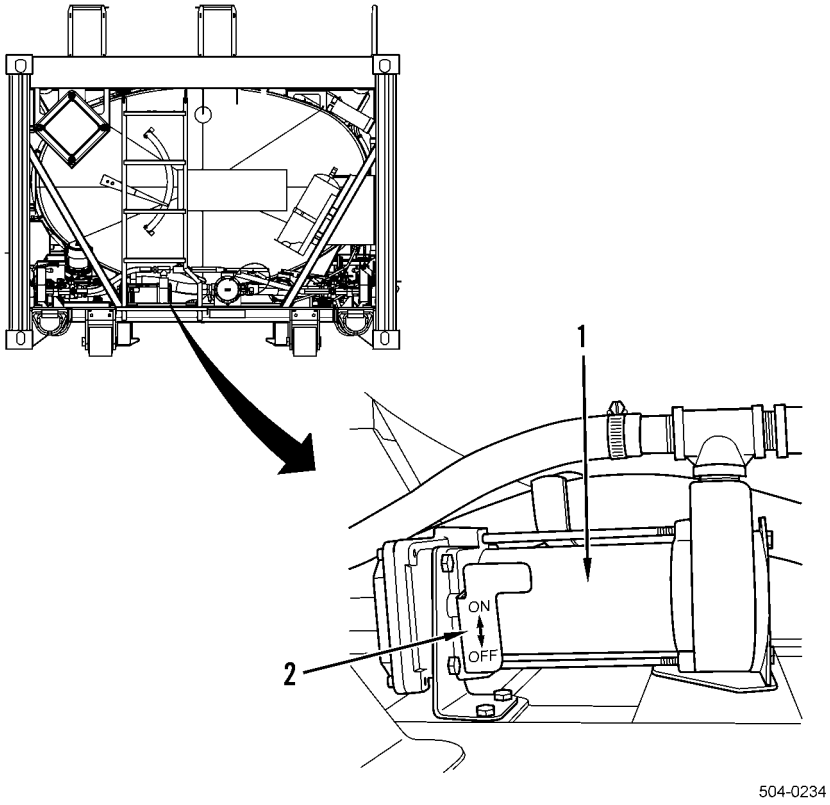


Figure 5. Fuel Pump Assembly.

Table 5. Fuel Pump Assembly Controls and Indicators.

KEY	CONTROL/INDICATOR	FUNCTION
1	Fuel Pump Assembly (Electric, 25 gpm [94.64 Lpm])	Dispenses and evacuates fuel from Port D and Port E hose lines.
2	ON and OFF switch	Starts and stops fuel pump assembly operation.

TRM CONTROLS AND INDICATORS – CONTINUED

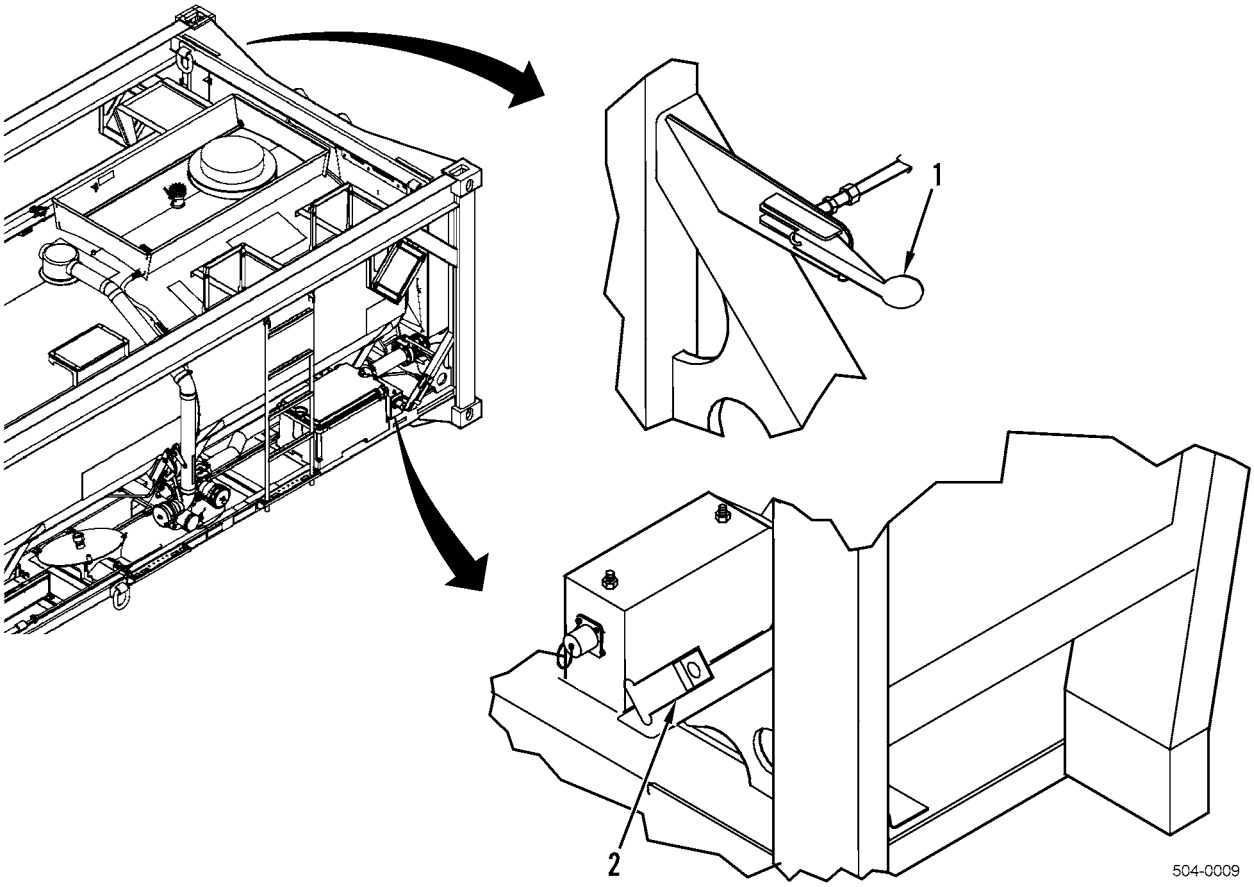


Figure 6. Left and Right Hand Emergency Stop.

Table 6. Left and Right Hand Emergency Stop Controls and Indicators.

KEY	CONTROL/INDICATOR	FUNCTION
1	Left Hand Emergency Shutoff Lever (Roadside)	Immediately stops the fuel flow from tank when activated.
2	Right Hand Emergency Shutoff Lever (Curbside)	Immediately stops the fuel flow from tank when activated.

TRM CONTROLS AND INDICATORS – CONTINUED

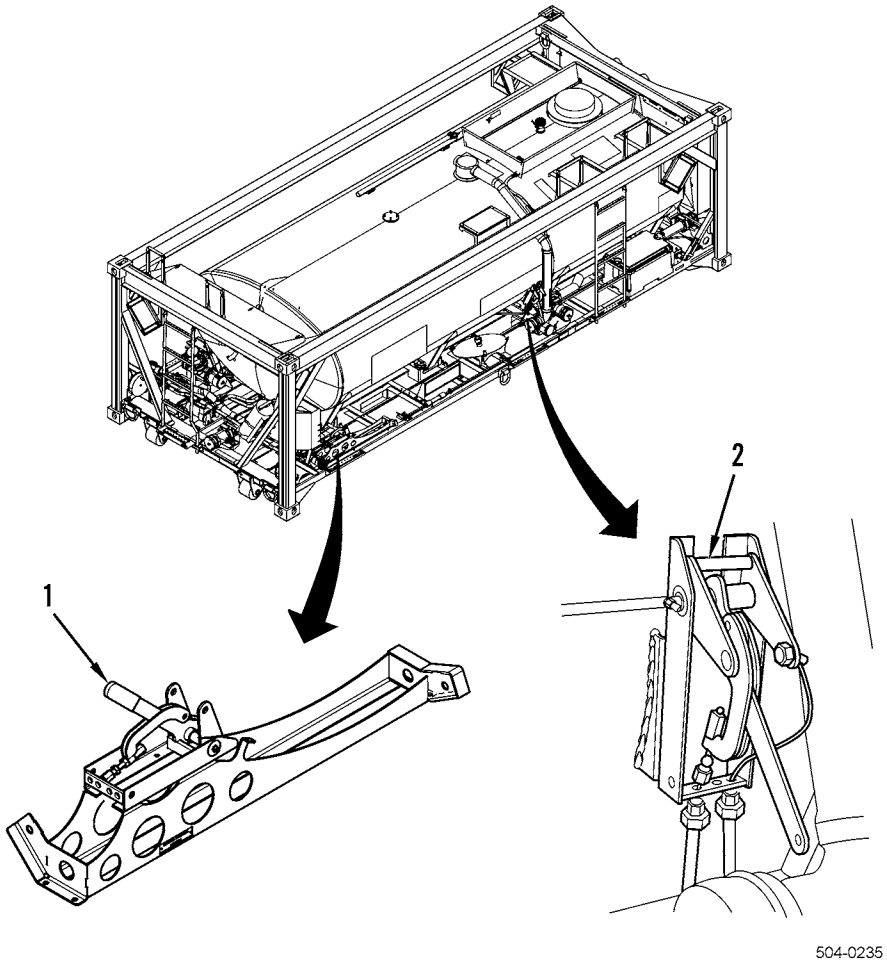


Figure 7. Control Levers for V1 Valve and V2 Valve.

Table 7. V1 Valve and V2 Valve Controls and Indicators.

KEY	CONTROL/INDICATOR	FUNCTION
1	Control Lever for V1 Valve	Starts and stops fuel flow from fuel tank to discharge piping assembly through ports C, D, or E.
2	Control Lever for V2 Valve	Receives or discharges fuel through Inlet Ports A, B, or G.

TRM CONTROLS AND INDICATORS – CONTINUED

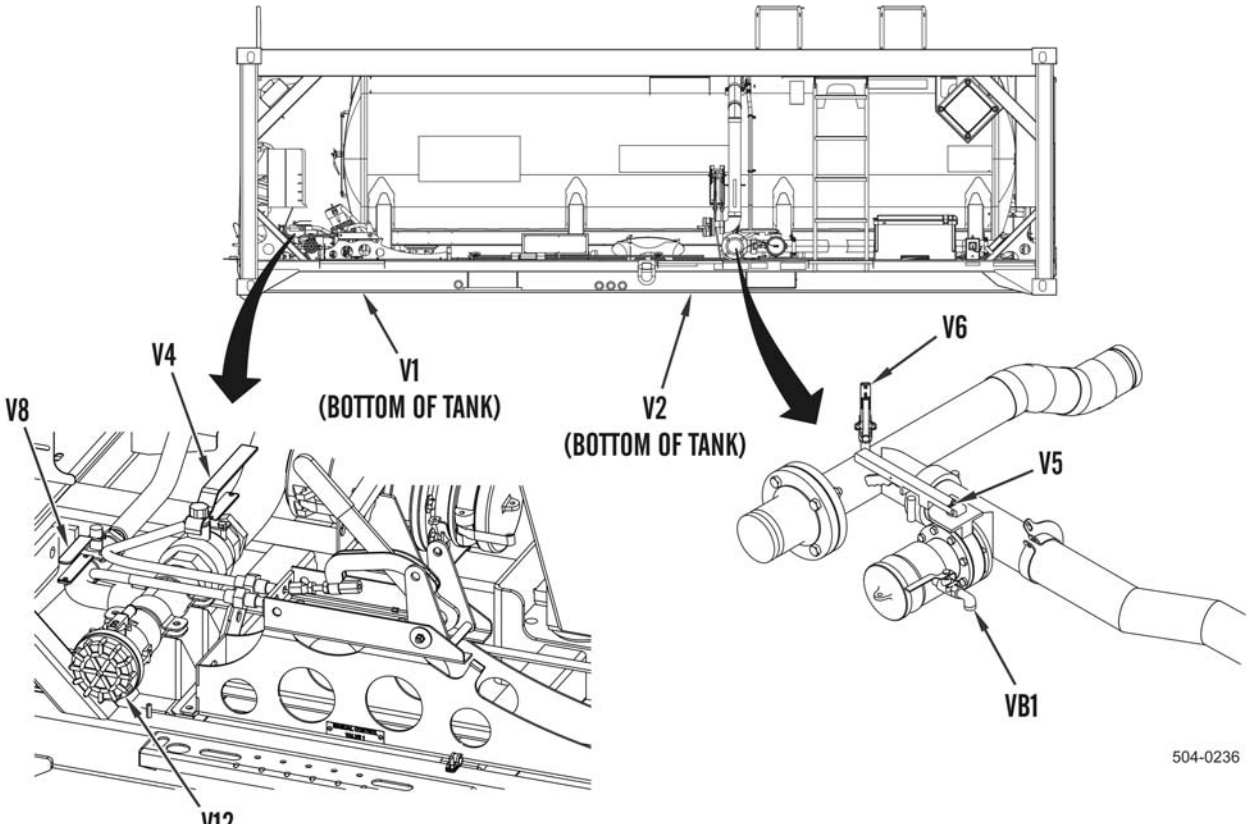


Figure 8. Valve Location (Sheet 1 of 3).

Table 8. Valve Identification.

VB1	Vacuum Breaker
V1	Discharge, Port C, D, E
V2	Inlet, Port A, B, G
V4	Discharge, Port E Gravity
V5	Butterfly Valve, Inlet Piping
V6	Precheck Ball Valve
V8	Discharge, Port E Pumped
V12	2 in. (5.08 cm) Unisex, Port E

TRM CONTROLS AND INDICATORS – CONTINUED

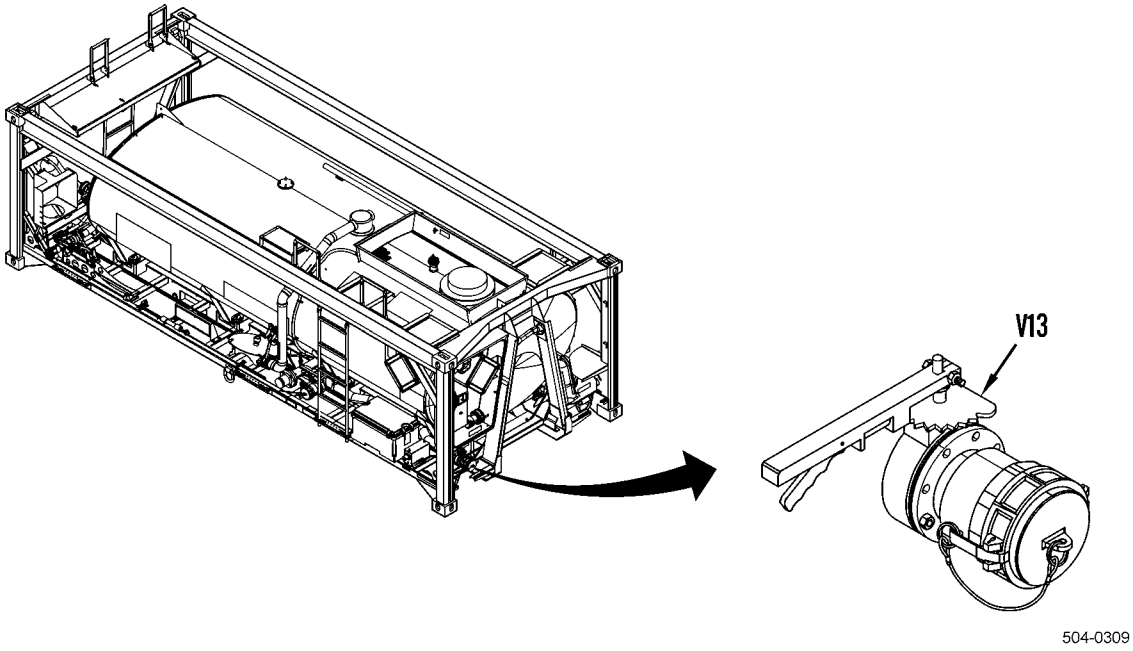


Figure 8. Valve Location (Sheet 2 of 3).

Table 8. Valve Identification - Continued.

V13	Butterfly Valve, Inlet Port G

TRM CONTROLS AND INDICATORS – CONTINUED

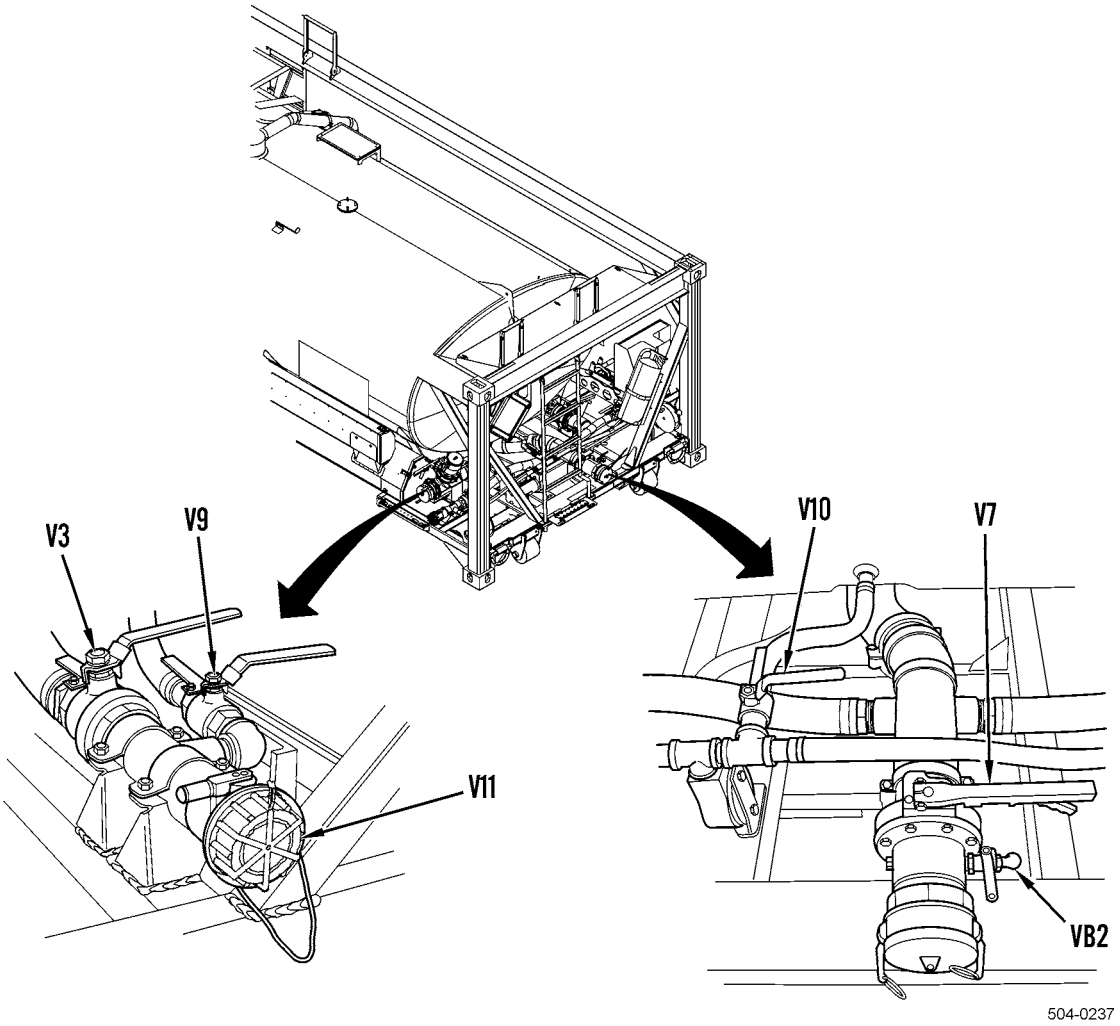


Figure 8. Valve Location (Sheet 3 of 3).

Table 8. Valve Identification - Continued.

VB2	Vacuum Breaker
V3	Discharge, Port D Gravity
V7	Discharge, Port C Control
V9	Discharge, Port D Pumped
V10	Evacuation Return
V11	2 in. (5.08 cm) Unisex, Port D

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS PREPARATION FOR USE
Emplacement and Setup Requirements, TRM Prior to Start Procedures

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

Personnel Required

Petroleum Supply Specialist 92F (2)

References

FM 10-67-1
WP 0004
WP 0013
WP 0018
WP 0030
WP 0031

EMPLACEMENT AND SETUP REQUIREMENTS

NOTE

Ensure the site has adequate space for TRM operations, and a road network that can safely move vehicles from a marshalling site to the refuel points and back to another post marshalling site. The selected site should have adequate space for storage and parking of vehicles. Parking of vehicles at distribution points should take into consideration all types of vehicles, terrain, and drainage requirements, if inclement weather is present during operations. An improved surface is recommended for the retail points. Site should provide for cover and concealment and should be located at a safe distance from populated areas to prevent congestion.

1. Prepare site per FM 10-67-1, Concepts and Equipment of Petroleum Operations.

NOTE

On hard surfaces such as asphalt or concrete, place rollers under TRM (WP 0018).

2. Lower TRM (WP 0013).
3. Mark location of TRM receiving and issuing points in accordance with mission requirements.

NOTE

Conduct ground and bond procedures for the TRM, as prescribed in FM 10-67-1. Position ground rods at an appropriate distance (3 to 5 ft/0.91 to 1.52 m) from TRM, as not to impede fueling operations.

4. Drive ground rod a minimum of 3 ft (0.91 m) into the ground and attach the TRM static reel cable.
5. Ensure safety and fire procedures are followed as prescribed in FM 10-67-1, Chapter 2.
6. Perform (BEFORE) Preventive Maintenance Checks and Services (PMCS) (WP 0030 and WP 0031).

END OF TASK

TRM PRIOR TO START PROCEDURES

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Failure to comply could result in injury or death to personnel.

1. Perform (BEFORE) PMCS checks (WP 0030 and WP 0031).
2. Place all valves in closed position.

NOTE

- V2 valve is used to receive or discharge fuel through Port A or B, if internal valve or V1 valve is inoperable.
- Ensure that all dust covers and dust caps are replaced upon completion of fueling operations and coupling disconnection.

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS TOP LOADING PORT F

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Nozzle assembly (WP 0152, Table 1, Item 8)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)

Personnel Required

Petroleum Supply Specialist 92F (2)

References

FM 10-67-1

Equipment Condition

TRM prepared for use (WP 0005)

TOP LOADING PORT F PROCEDURES

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

TOP LOADING PORT F PROCEDURES – CONTINUED

1. Close all valves and place drip pans at disconnect points.
2. Open manhole cover.
3. Remove dust caps from Port F and 2 in. (5.08 cm) discharge fuel hose.
4. Connect nozzle assembly to 2 in. (5.08 cm) discharge fuel hose.
5. Connect 2 in. (5.08 cm) discharge fuel hose with nozzle assembly to external transfer pump and insert nozzle into Port F.

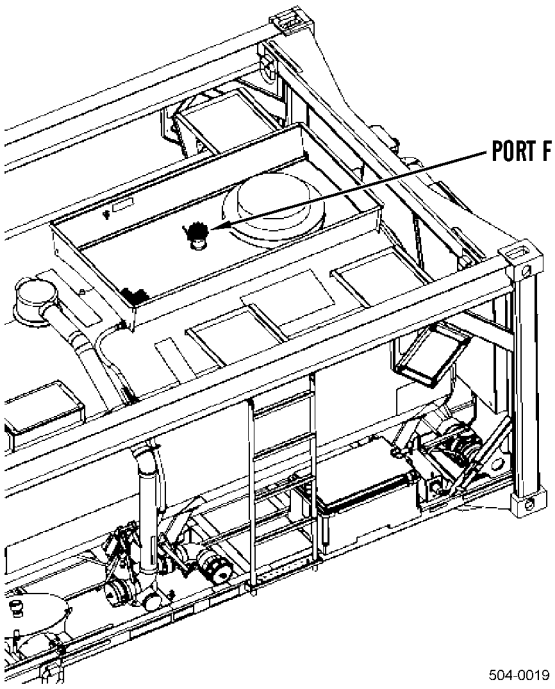


Figure 1. Top Loading TRM Port F.

6. Remove dust cap from the vapor recovery line.

WARNING

Have the second 92F observe fuel flow from manhole cover to avoid overfilling tank. Spilled fuel could result in injury or death to personnel.

7. Start external transfer pump.
8. Begin top load fueling operations through Port F.
9. Shut down external transfer pump.
10. Reverse direction of fuel flow, open nozzle and evacuate 2 in. (5.08 cm) discharge fuel hose.
11. Disconnect 2 in. (5.08 cm) discharge fuel hose from external transfer pump, remove nozzle assembly and replace dust caps.
12. Close manhole cover and replace vapor recovery line dust cap.

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS BOTTOM LOADING PORT B

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)

Personnel Required

Petroleum Supply Specialist 92F (2)

References

FM 10-67-1

Equipment Condition

TRM prepared for use (WP 0005)

BOTTOM LOADING PORT B PROCEDURES

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

BOTTOM LOADING PORT B PROCEDURES – CONTINUED

1. Close all valves and place drip pans at disconnect points.
2. Open manhole cover.
3. Connect 4 in. discharge fuel hose from external transfer pump to Port B.

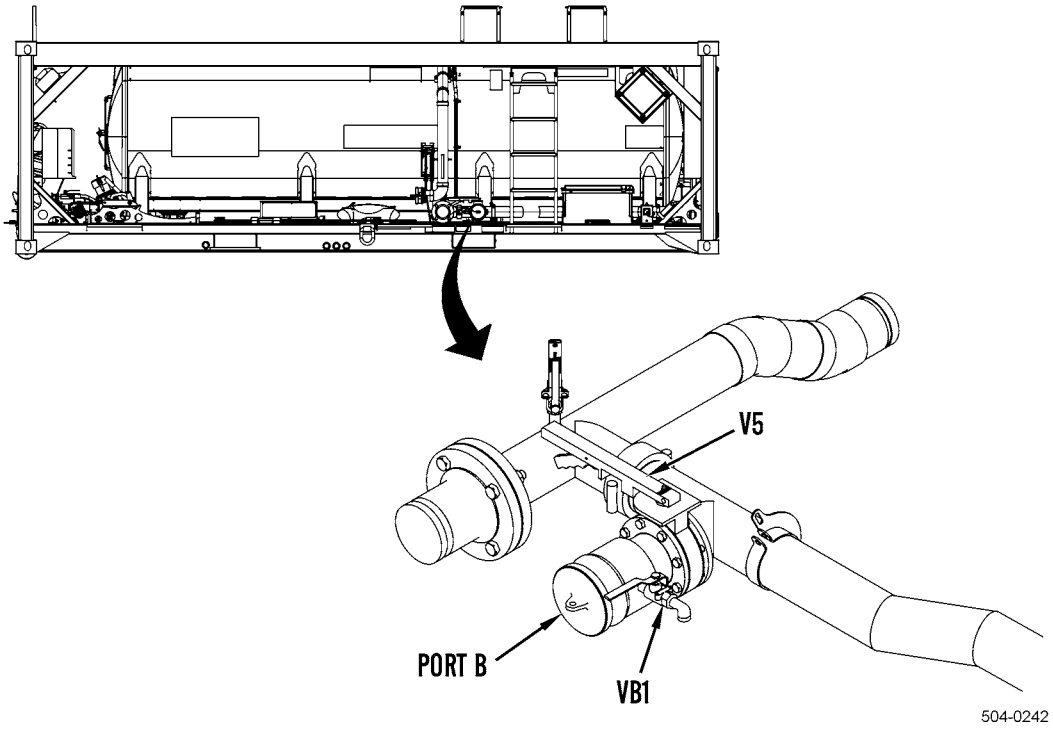


Figure 1. Bottom Loading Port B.

4. Open V5 valve.
5. Remove cap from the vapor recovery line.
6. Start external transfer pump and begin fueling operation through Port B.

NOTE

TRM must be on level ground for liquid level switch and tank gauge to operate properly. Liquid level switch detects when fuel has reached maximum fill level of 2,500 gal. (9,464 L). When TRM is full, liquid level switch closes V2 valve and stops fuel flow into TRM.

7. To verify operation of liquid level switch, open V6 valve. Fuel flow should stop in approximately 15 seconds.
   a. If liquid level switch is operational, close V6 valve.
   b. If liquid level switch is not operational, close V6 valve and have second 92F observe fuel flow from manhole cover.

WARNING

Avoid overfilling tank. Spilled fuel could result in injury or death to personnel.

8. Continue fueling operations.

BOTTOM LOADING PORT B PROCEDURES – CONTINUED

9. After loading is complete, shut off external transfer pump, and close V5 valve.
10. To initiate hose evacuation, reverse fuel flow using external transfer pump.
11. Place drip pan under vacuum breaker VB1 valve and momentarily open valve.
12. Carefully break hose connection at Port B to assist hose evacuation. Verify vacuum is present.
13. Lift hose end disconnected from Port B above height of supply source for approximately two minutes to assist in hose evacuation.
14. Close supply source valve and shut off external transfer pump.
15. Carefully discharge residual fuel from 4 in. hose into drip pans.
16. Carefully disconnect hose from supply source and discharge any remaining fuel into drip pans.
17. Replace dust cap and plug on hose, Port B, and vapor recovery line.
18. Close manhole cover.

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS BOTTOM LOADING PORT A

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)

Personnel Required

Petroleum Supply Specialist 92F (2)

References

FM 10-67-1

Equipment Condition

TRM prepared for use (WP 0005)

BOTTOM LOADING PORT A PROCEDURES

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

BOTTOM LOADING PORT A PROCEDURES – CONTINUED

1. Close all valves and place drip pans at disconnect points.
2. Open manhole cover.
3. Connect the D1 Nozzle from external transfer pump to Port A.
4. Open valve on D1 nozzle.

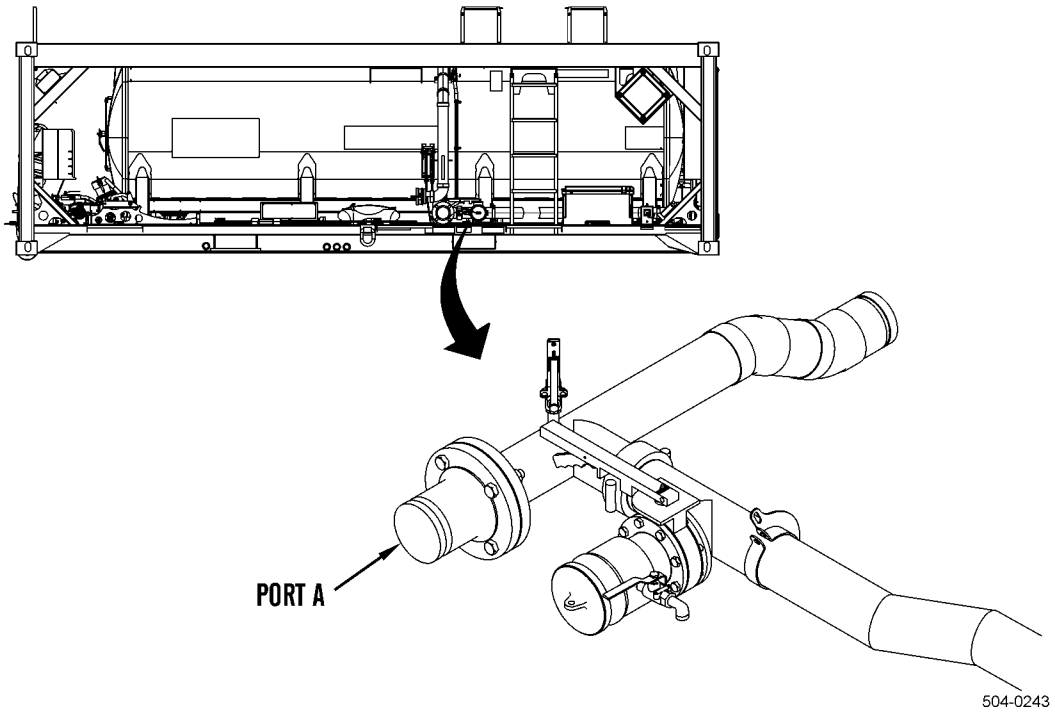


Figure 1. Bottom Loading Port A.

5. Remove cap from the vapor recovery line.
6. Start external transfer pump and begin fueling operation.

NOTE

TRM must be on level ground for liquid level switch and tank gauge to operate properly. Liquid level switch detects when fuel has reached maximum fill level of 2,500 gal. (9,464 L). When TRM is full, liquid level switch closes V2 valve and stops fuel flow into TRM.

7. To verify operation of liquid level switch, open V6 valve. Fuel flow should stop in approximately 15 seconds.
   a. If liquid level switch is operational, close V6 valve.
   b. If liquid level switch is not operational, close V6 valve and have second 92F observe fuel flow from manhole cover.

BOTTOM LOADING PORT A PROCEDURES – CONTINUED

WARNING

Avoid overfilling tank. Spilled fuel could result in injury or death to personnel.

8. Continue fueling operations.
9. After loading is complete, shut off external transfer pump and close valve on D1 nozzle.
10. Evacuate hoses using external transfer pump.
11. Disconnect D1 nozzle from Port A.
12. Replace dust caps on D1 nozzle, Port A, and vapor recovery line.
13. Close manhole cover.

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS PUMP DISCHARGE PORT D AND PORT E

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)
Hose, discharge, 2 in. x 13 ft (WP 0152, Table 1, Item 2) (2)

Personnel Required

Petroleum Supply Specialist 92F (2)

References

FM 10-67-1
WP 0004
WP 0010
WP 0012
WP 0028

Equipment Condition

TRM prepared for use (WP 0005)

PUMP DISCHARGE PORT D AND PORT E PROCEDURES

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

NOTE

The primary method to issue fuel is gravity discharge (WP 0010). Pump discharge is an alternate method of issuing fuel. Ensure drip pans are placed at disconnect points.

PUMP DISCHARGE PORT D AND PORT E PROCEDURES – CONTINUED

1. Close all valves.
2. Open manhole cover.
3. Remove cap from vapor recovery line.
4. Connect a 2 in. (5.08 cm) x 13 ft (3.96 m) discharge hose to Port D or Port E.
5. Open valve on 2 in. discharge hose at port end.
6. Connect the second 2 in. (5.08 cm) x 13 ft (3.96 m) discharge hose to first discharge hose.
7. Connect open end of second discharge hose to open port of nozzle assembly.

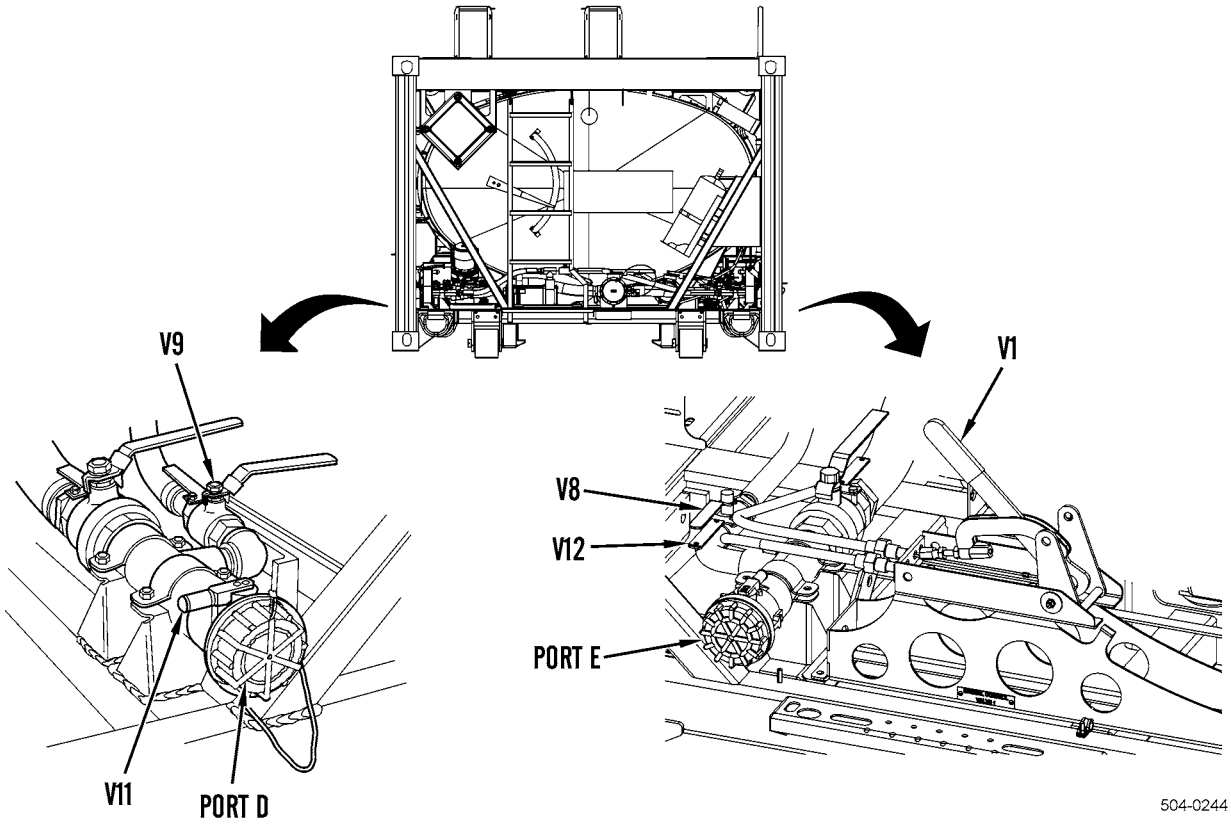


Figure 1. Valve Location, Port D and Port E.

CAUTION

Ensure fuel pump assembly is primed with fuel prior to operation. Dry running can damage the fuel pump assembly components. The fuel pump assembly has a duty cycle of 30 minutes ON and 30 minutes OFF.

8. Open remaining valves on 2 in. (5.08 cm) x 13 ft (3.96 m) discharge hoses.
9. Open V1 valve to allow fuel flow from tank to pump.
10. If discharging from Port D: Open V9 and V11 valves.
11. If discharging from Port E: Open V8 and V12 valves.

PUMP DISCHARGE PORT D AND PORT E PROCEDURES – CONTINUED

NOTE

If fuel pump assembly does not activate or slows during operation, refer to WP 0028. Open and close nozzle assembly to control fuel flow.

12. Turn fuel pump assembly power switch to the ON position (WP 0004), and begin fueling operations.
13. After completion of fueling operation, turn fuel pump assembly power switch to OFF position (WP 0004).
14. Close V1 valve.
15. If discharged from Port D: close V9 and V11 valves.
16. If discharged from Port E: close V8 and V12 valves.
17. Perform hose evacuation (WP 0012).
18. Disconnect and replace dust covers on Ports D or E, fuel nozzle, and 2 in. (5.08 cm) x 13 ft (3.96 m) discharge hoses.

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS GRAVITY DISCHARGE PORT D AND PORT E

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)
Hose, discharge, 2 in. x 13 ft (WP 0152, Table 1, Item 2) (2)

Personnel Required

Petroleum Supply Specialist 92F (2)

References

FM 10-67-1
WP 0012

Equipment Condition

TRM prepared for use (WP 0005)

GRAVITY DISCHARGE PORT D AND PORT E PROCEDURES

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

NOTE

Ensure drip pans are placed at disconnect points.

GRAVITY DISCHARGE PORT D AND PORT E PROCEDURES – CONTINUED

1. Close all valves.
2. Open manhole cover and remove dust cap from vapor recovery line.
3. Connect a 2 in. (5.08 cm) x 13 ft (3.96 m) discharge hose to Port D or E.
4. Open valve on 2 in. discharge hose.

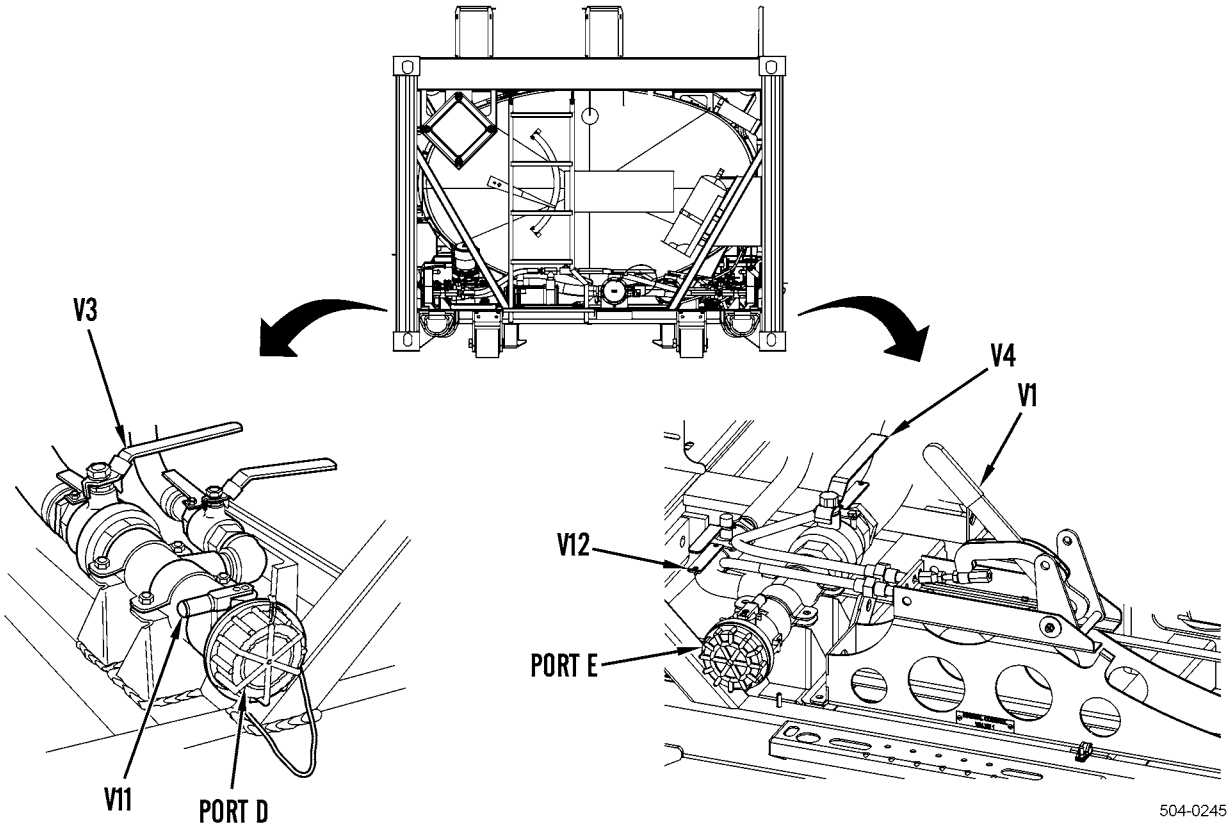


Figure 1. Gravity Discharge Port D and Port E.

5. Connect the second 2 in. (5.08 cm) x 13 ft (3.96 m) discharge hose to the first discharge hose.
6. Close valve on 2 in. discharge hose.
7. Connect open 2 in. discharge hose to fuel nozzle.
8. If discharging from Port D: Open V1, V3 and V11 valves.
9. If discharging from Port E: Open V1, V4, and V12 valves.
10. Open remaining valves on 2 in. (5.08 cm) x 13 ft (3.96 m) discharge hoses.
11. Begin gravity discharge through Port D or E.
12. If discharging from Port D: Close V1, V3, and V11 valves.
13. If discharging from Port E: Close V1, V4, and V12 valves.
14. When fueling operations are completed, evacuate 2 in. (5.08 cm) x 13 ft (3.96 m) discharge hoses (WP 0012).
15. Disconnect and replace dust covers on Port D or E, fuel nozzle, and 2 in. (5.08 cm) x 13 ft (3.96 m) discharge hoses.

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS DISCHARGE PORT C
Discharge Port C Procedures, System Evacuation

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)

Personnel Required

Petroleum Supply Specialist 92F (2)

References

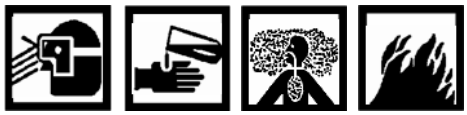
FM 10-67-1
WP 0012

Equipment Condition

TRM prepared for use (WP 0005)

DISCHARGE PORT C PROCEDURES

WARNING



- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

NOTE

Ensure drip pans are placed at disconnect points.

DISCHARGE PORT C PROCEDURES – CONTINUED

1. Close all valves and place drip pans at disconnect points.
2. Open manhole cover.
3. Remove cap from vapor recovery line.
4. Remove Port C dust cap and connect discharge fuel hose from external transfer pump to Port C.
5. Open V1 valve and V7 valve.
6. Start external transfer pump and begin discharge operation through Port C.

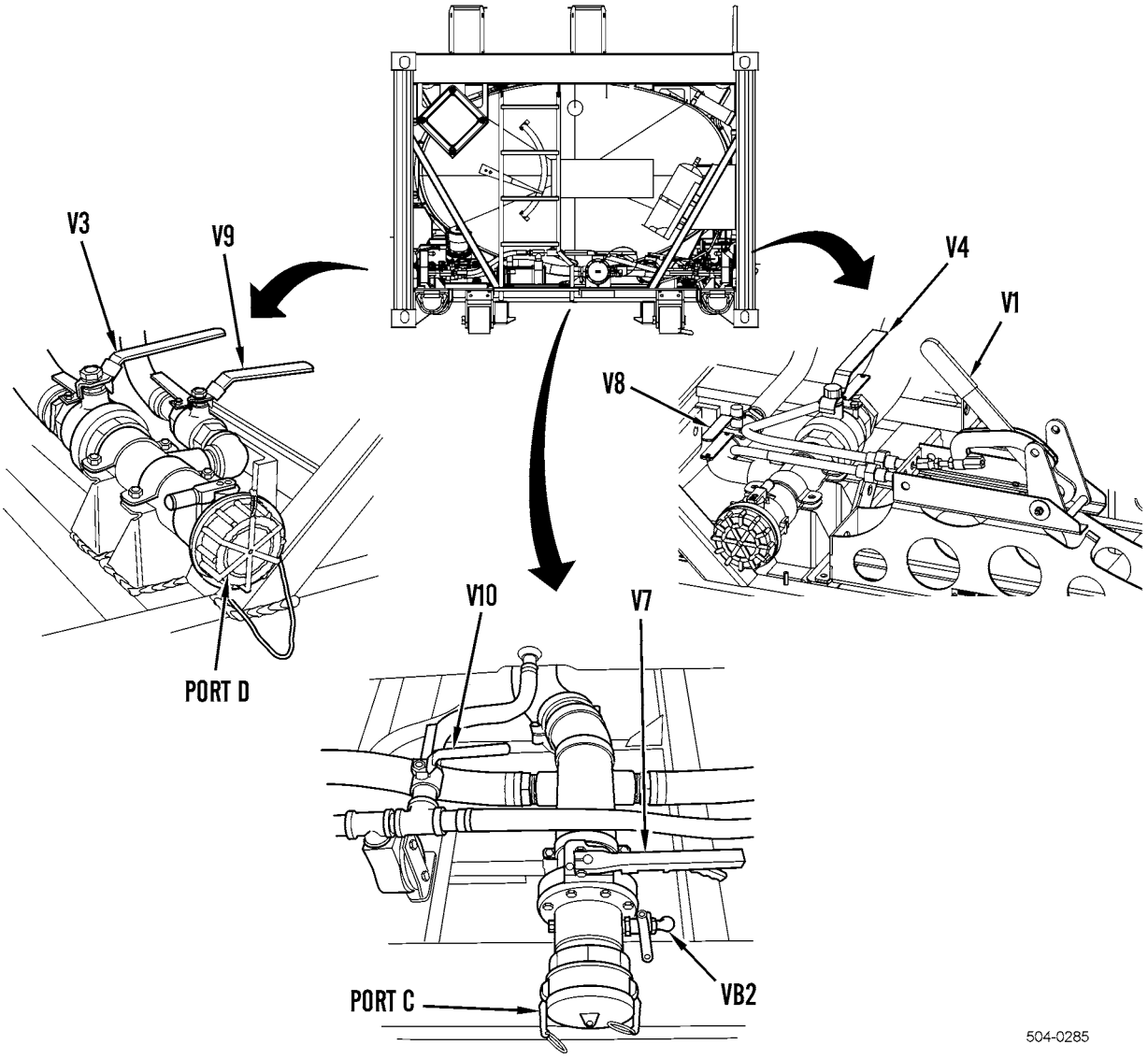


Figure 1. Discharge TRM Port C.

7. After loading is complete, close V1 valve.
8. Continue to run external pump to evacuate Port C discharge piping.
9. Close V7 valve.
10. Place drip pan under vacuum breaker VB2 valve, and momentarily open valve.

DISCHARGE PORT C PROCEDURES – CONTINUED

11. Carefully break hose connection at Port C to assist hose evacuation. Verify vacuum is present.
12. Lift hose end disconnected from Port C above height of supply source for approximately two minutes to assist in hose evacuation.
13. Close supply source valve and shut off external transfer pump.
14. Carefully discharge residual fuel from 4 in. hose into drip pans.
15. Carefully disconnect hose from supply source and discharge any remaining fuel into drip pans.
16. Replace dust cap and plugs on hose, Port C, and vapor recovery line.
17. Close manhole cover.

END OF TASK

SYSTEM EVACUATION

1. Place drip pan under VB2 valve (near V7 valve).
2. Ensure all valves are closed.
3. Open V10 and V7 valves.
4. Turn on electric pump.
5. Crack VB2 valve until air suction is heard for approximately 5 seconds.
6. Close VB2 valve.
7. Close V7 valve.
8. Turn off electric pump.
9. Open V3 and V4 valves.
10. Turn on electric pump for 30 seconds.
11. Turn off electric pump.
12. Open V8 and V9 valves for approximately 10 seconds.
13. Close V8 and V9 valves.
14. Turn on electric pump for 30 seconds.
15. Turn off electric pump.
16. Close all valves.

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS HOSE EVACUATION PORT D AND PORT E

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)

Personnel Required

Petroleum Supply Specialist 92F (2)

References

FM 10-67-1
WP 0028

Equipment Condition

TRM prepared for use (WP 0005)

HOSE EVACUATION PORT D AND PORT E PROCEDURES

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

NOTE

Ensure drip pans are placed at disconnect points.

HOSE EVACUATION PORT D AND PORT E PROCEDURES – CONTINUED

1. Open manhole cover and remove dust cap from vapor recovery line.
2. If evacuating Port D: Open valves V10, V3, and V11 (Figure 1).
3. If evacuating Port E: Open valves V10, V4, and V12 (Figure 1).

CAUTION

The pump has a duty cycle of 30 minutes ON and 30 minutes OFF. Failure to follow this caution could result in damage to equipment.

NOTE

If fuel pump assembly slows down during operation or does not activate, refer to (WP 0028).

4. Turn fuel pump assembly switch ON and begin evacuation operations.
5. Keeping nozzle assembly above the height of Port D on Port E, open all dry break valves to evacuate hoses.

NOTE

- Place drip pan under dry break connections before disconnecting.
- To aid in evacuation of hoses, it is necessary to hold nozzle assembly above level of fuel pump assembly.
- Open and close nozzle assembly to create back pressure.

6. Walk hoses toward Port D or E.
7. Close Port D valves V3 and V11 and/or Port E valves V4 and V12.
8. Disconnect each hose section.
9. Turn fuel pump assembly switch OFF.

HOSE EVACUATION PORT D AND PORT E PROCEDURES – CONTINUED

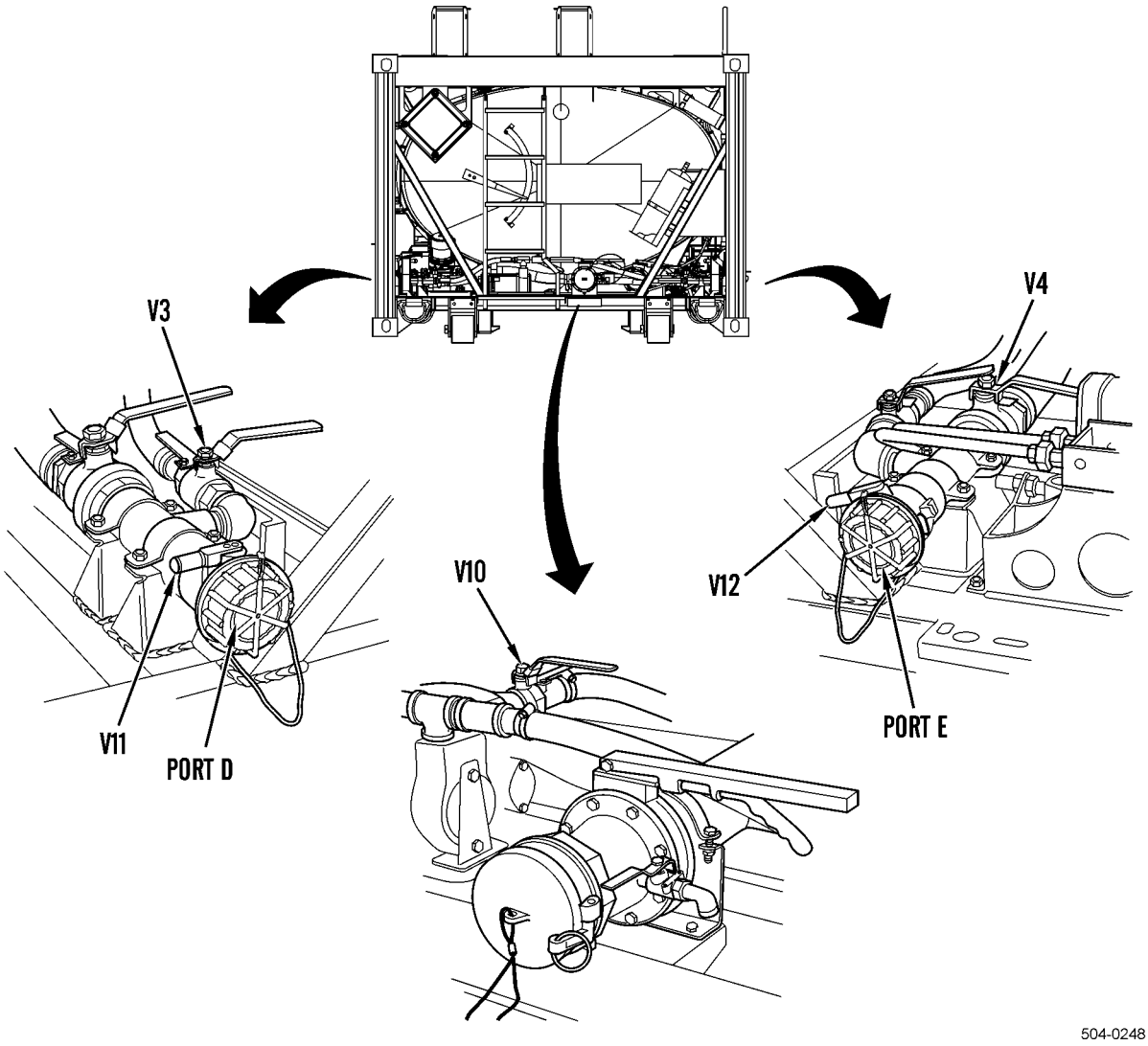


Figure 1. Hose Evacuation Port D and Port E.

10. Close V10 valve.
11. Replace vapor recovery line dust cap and close manhole cover.
12. Stow remaining equipment.

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS UPLOAD AND DOWNLOAD TRM

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

Personnel Required

Petroleum Supply Specialist 92F (2)

References

TM 9-2320-364-10
TM 9-2320-385-10
TM 9-2320-424-10
WP 0018

UPLOAD AND DOWNLOAD TRM

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Know load limits of your lift before attempting to lift TRM. Keep personnel at least 6 ft (2 m) away from TRM being raised.
- Failure to comply could result in injury or death to personnel.

CAUTION

- Prior to uploading or downloading the TRM onto or off the PLS Trailer, the roller assemblies of the TRM must be in the emplacement position (WP 0018). This will prevent damage to TRM frame.
- Ensure TRM is not being placed on parts which might be damaged. Lower TRM and readjust lift before continuing further if contact with equipment is not even or if it looks as if TRM may slip. Failure to comply could result in damage to equipment.

Refer to TM 9-2320-364-10, *Operator's Manual for Truck, Tractor, M1074 and M1075 Palletized Load System (PLS)*, for procedures to upload and download TRM from PLS.

Refer to TM 9-2330-385-10, *Operator's Manual for PLST, M1076*, for procedures to upload and download TRM from PLST.

Refer to TM 9-2320-424-10, *Operator's Manual for LHS, M1120A2*, for procedures to upload and download from LHS.

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS HEMTT INTERFACE

Longitudinal Transfer Using Vehicle Pump (TRM to HEMTT), Longitudinal Transfer Using Vehicle Pump (HEMTT to TRM), Transverse Transfer Using Vehicle Pump (TRM to HEMTT), Transverse Transfer Using Vehicle Pump (HEMTT to TRM)

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)
Flange adapter assembly (WP 0152, Table 1, Item 12)
Hose, discharge, 4 in. x 8 ft, 3 in. (WP 0152, Table 1, Item 4)
Hose, discharge, 4 in. x 6 ft, 2 in. (WP 0152, Table 1, Item 5)
Hose, discharge, 3 in. x 3.5 ft (WP 0152, Table 1, Item 10)
Reducer, quick disconnect, 4 to 3 in. (WP 0152, Table 1, Item 11)
Hose, discharge, 4 in. x 15 ft (WP 0152, Table 1, Item 3)

Personnel Required

Petroleum Supply Specialist 92F (2)

References

FM 10-67-1
TM 9-2320-325-14&P
TM 9-2320-339-10
TM 9-2320-348-10
TM 9-2320-429-10
WP 0004

Equipment Condition

TRM prepared for use (WP 0005)
TRM mounted on PLS trailer (WP 0013)

LONGITUDINAL TRANSFER USING VEHICLE PUMP (TRM TO HEMTT)

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

NOTE

- Ensure drip pans are placed at disconnect points.
- Refer to Operator Controls and Indicators (WP 0004) for location of connection points and valves.

Set Up

NOTE

- TRM to HEMTT transfer is not a defuel mission.
- Operation procedures below are typical. References are to TM 9-2320-429-10. Use TM in References list in INITIAL SETUP for HEMTT tanker being used for fueling operations.
- Position HEMTT approximately 7 ft. (2 m) from TRM.
- Refer to Figures 1 and 2.

1. Close all valves on HEMTT and TRM.
2. Open manhole covers on HEMTT and TRM.
3. Connect 4 in. x 8 ft. (10 cm x 2.4 m) hose to HEMTT and TRM.
   a. Connect hose to HEMTT Port B gravity receptacle (Figure 1, Item 5).
   b. Connect hose to TRM port G.

WARNING

Ensure valve on flange adapter assembly (D1) is closed until given direction to open to prevent injury or death to personnel.

4. Connect 3 in. x 3.5 ft. (7.6 cm x 1.1 m) suction hose (straight end) to HEMTT Port C (Figure 1, Item 3) bulk receptacle.
5. Connect flange adapter assembly (D1) to HEMTT Port A (Figure 1, Item 1) receptacle (bottom load inlet).
6. Connect 3 in. x 3.5 ft. (7.6 cm x 1.1 m) suction hose (elbow end) to flange adapter assembly (D1).
7. Open TRM V2 valve.

LONGITUDINAL TRANSFER USING VEHICLE PUMP (TRM TO HEMTT) – CONTINUED

Set Up - Continued

8. Open TRM V13 valve (Port G).
9. Position lever on flange adapter assembly (D1) to OPEN position.
10. Open V17 valve (Figure 1, Item 4) on HEMTT.
11. Open V18 valve (Figure 1, Item 2) on HEMTT.

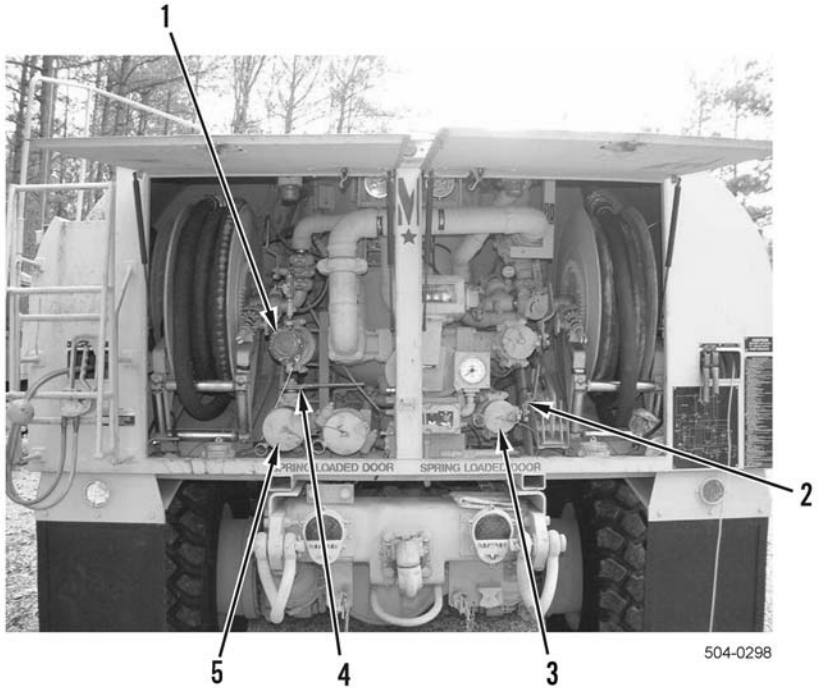


Figure 1. HEMTT Setup.

LONGITUDINAL TRANSFER USING VEHICLE PUMP (TRM TO HEMTT) – CONTINUED

Set Up - Continued

12. Start fuel transfer in accordance with TM 9-2320-429-10 and highlighted below.
    a. Push PUMP ENGAGEMENT LEVER (Figure 2, Item 4) on the HEMTT forward.
    b. Set TC/THROTTLE CONTROL switch (Figure 2, Item 3) up to ON position.
    c. Press HI/HIGH IDLE switch (Figure 2, Item 2).
    d. Pull out HAV HAND ACTUATED CONTROL valve (Figure 2, Item 1).

NOTE

HAV HAND ACTUATED CONTROL valve must be open for fuel to flow.

    e. Squeeze and hold lever to open HAV HAND ACTUATED CONTROL valve (Figure 2, Item 1).

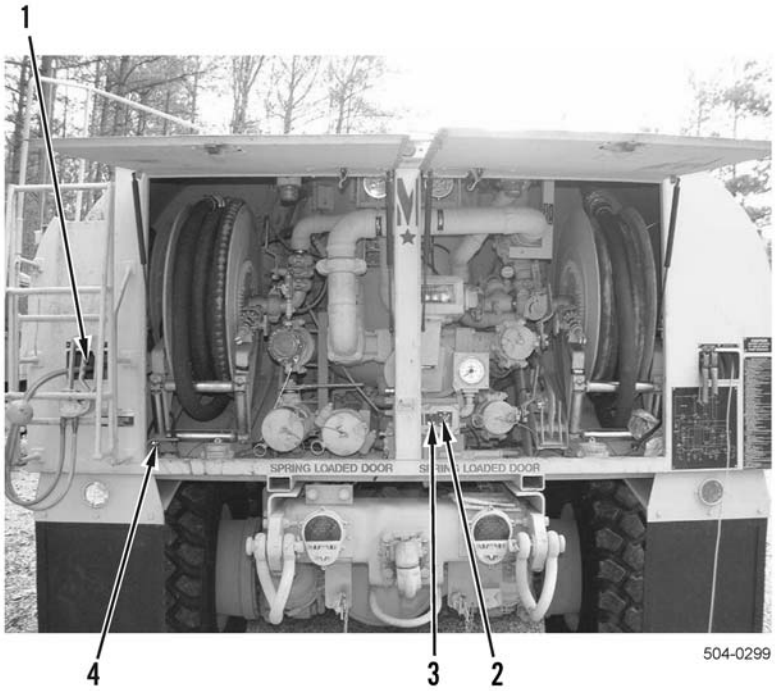


Figure 2. HEMTT Operation.

LONGITUDINAL TRANSFER USING VEHICLE PUMP (TRM TO HEMTT) – CONTINUED

Take Down

WARNING

Continue to squeeze and hold the HAV HAND ACTUATED CONTROL valve until hose evacuation is complete (V17 valve is closed). Failure to do so will result in equipment damage and personal injury.

1. When fuel transfer is complete, disengage high idle (Figure 2, Item 2).
2. Close V2 valve on TRM.
3. Engage high idle:
   a. Set TC/Throttle Control switch (Figure 2, Item 3) up to ON position.
   b. Press HI/HIGH IDLE switch (Figure 2, Item 2).
4. Continue to operate HEMTT pump for approximately 2 minutes to evacuate fuel from TRM lower piping.
5. Close V13 valve (Port G) on TRM and continue to operate HEMTT pump for approximately 1 minute to evacuate fuel from 4 in. x 8 ft. (10 cm x 2.4 m) hose.
6. Carefully break hose connection at Port G on TRM to assist in hose evacuation process. Verify vacuum is present.

LONGITUDINAL TRANSFER USING VEHICLE PUMP (TRM TO HEMTT) – CONTINUED

Take Down - Continued

7. Lift 4 in. x 8 ft. (10 cm x 2.4 m) hose connection at TRM and elevate above B Gravity Port (Figure 3, Item 6) on HEMTT in order to assist in hose evacuation process.
8. Reinstall dust cap on TRM Port G.
9. Close V17 valve (Figure 3, Item 5) (Port B) at HEMTT.
10. Stop HEMTT pump in accordance with TM 9-2320-429-10 and highlighted below.
    a. Let go of HAV HAND ACTUATED CONTROL valve lever (Figure 3, Item 8).
    b. Pull back on PUMP ENGAGEMENT LEVER (Figure 3, Item 7) until locked.

CAUTION

Carefully guide HAV HAND ACTUATED CONTROL valve hoses through access hole onto reel. Failure to comply may result in damage to equipment.

    c. Rewind HAV HAND ACTUATED CONTROL valve (Figure 3, Item 8) hoses onto reel.
    d. Set TC/THROTTLE CONTROL switch (Figure 3, Item 4) down to OFF position.
11. Position high end of 4 in. x 8 ft. (10 cm x 2.4 m) hose over drip pan and discharge residual fuel in a controlled manner.
12. Disconnect 4 in. x 8 ft. (10 cm x 2.4 m) hose from Port B (Figure 3, Item 6) on HEMTT.

CAUTION

Hose connection in the following steps will contain fuel. Use care to discharge excess fuel into drip pans and avoid contact.

13. Close V18 valve (Figure 3, Item 2) on HEMTT.
14. Close D1 valve lever on D1 nozzle.
15. Carefully disconnect D1 nozzle from Port A (Figure 3, Item 1) on HEMTT.
16. Lower D1 end of hose below height of Port C (Figure 3, Item 3).
17. Carefully break connection at Port C (Figure 3, Item 3) on HEMTT and drain remaining fuel into suitable drip pan.
18. Disassemble the 3 in. x 3.5 ft (7.6 cm x 1.1 m) hose assembly and stow all hoses.
19. Close manhole covers on HEMTT and TRM.

LONGITUDINAL TRANSFER USING VEHICLE PUMP (TRM TO HEMTT) – CONTINUED

Take Down - Continued

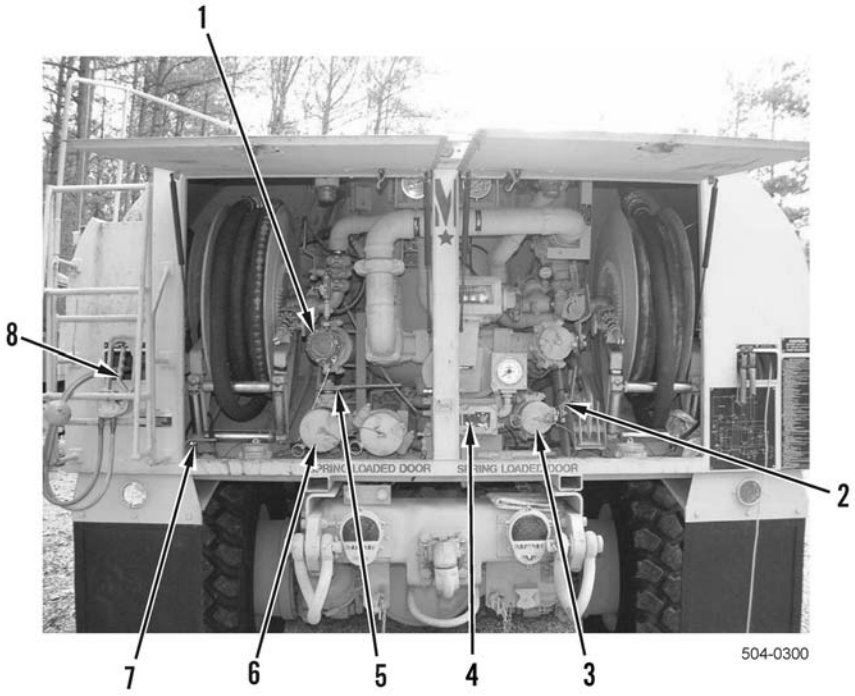


Figure 3. HEMTT Take Down.

END OF TASK

LONGITUDINAL TRANSFER USING VEHICLE PUMP (HEMTT TO TRM)

Set Up

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

LONGITUDINAL TRANSFER USING VEHICLE PUMP (HEMTT TO TRM) – CONTINUED

Set Up - Continued

NOTE

- Operation procedures below are typical. References are to TM 9-2320-429-10. Use TM in References list in INITIAL SETUP for HEMTT tanker being used for fueling operations.
- Ensure drip pans are placed at disconnect points.
- Refer to Operator Controls and Indicators (WP 0004) for location of connection points and valves.
- Position HEMTT approximately 7 ft. (2 m) from TRM.
- Refer to Figure 4.

1. Close all valves on HEMTT and TRM.
2. Open manhole covers on HEMTT and TRM.
3. Connect 4 in. to 3 in. (10 cm x 7.62 cm) reducer to Port D (Figure 4, Item 1) on HEMTT.
4. Connect 4 in. x 6 ft. (10 cm x 1.8 m) hose to HEMTT and TRM.
   a. Connect hose to 4 in. to 3 in. (10 cm x 7.62 cm) reducer at Port D on HEMTT.
   b. Connect hose to TRM port G.
5. Open TRM V13 valve.
6. Open V11 valve (Figure 4, Item 3) (Port D) on HEMTT.
7. Open dump valve (Figure 4, Item 4) on HEMTT.
8. Verify V6 valve (Figure 4, Item 2) on HEMTT is positioned to “Fuel” mode.

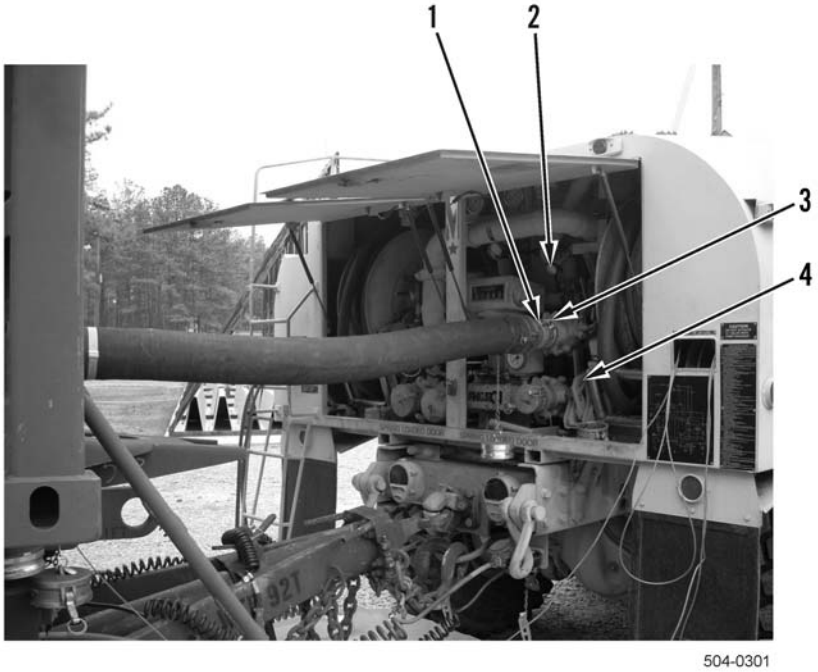


Figure 4. HEMTT Setup.

LONGITUDINAL TRANSFER USING VEHICLE PUMP (HEMTT TO TRM) – CONTINUED

Set Up - Continued

9. Start fuel transfer in accordance with TM 9-2320-429-10 and highlighted below.
   a. Push PUMP ENGAGEMENT LEVER (Figure 5, Item 4) on HEMTT forward.
   b. Set TC/THROTTLE CONTROL switch (Figure 5, Item 3) up to ON position.
   c. Press HI/HIGH IDLE switch (Figure 5, Item 2).
   d. Pull out HAV HAND ACTUATED CONTROL valve (Figure 5, Item 1).

NOTE

HAV HAND ACTUATED CONTROL valve must be open for fuel to flow.

   e. Squeeze and hold lever to open HAV HAND ACTUATED CONTROL valve (Figure 5, Item 1).

NOTE

TRM must be on level ground for liquid level switch and tank gauge to operate properly. Liquid level switch detects when fuel has reached maximum fill level of 2,500 gal. (9,464 L). When TRM is full, liquid level switch closes V2 valve and stops fuel flow into TRM.

10. To verify operation of liquid level switch, open V6 valve. Fuel flow should stop in approximately 15 seconds.
    a. If liquid level switch is operational, close V6 valve.
    b. If liquid level switch is not operational, close V6 valve and have second 92F observe fuel flow from manhole cover.

WARNING

Avoid overfilling tank. Spilled fuel could result in injury or death to personnel.

11. Continue fueling operations.

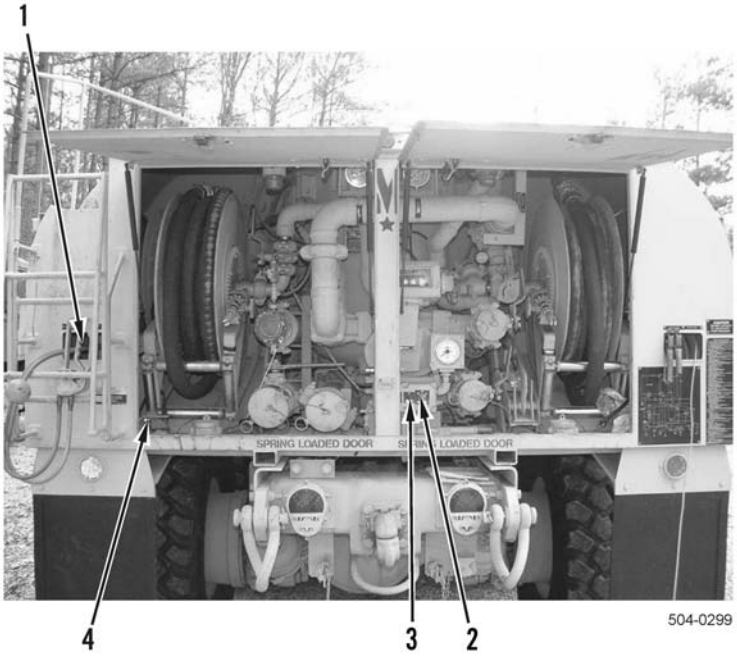


Figure 5. HEMTT Operation.

LONGITUDINAL TRANSFER USING VEHICLE PUMP (HEMTT TO TRM) – CONTINUED

Take Down

WARNING

Continue to squeeze and hold the HAV HAND ACTUATED CONTROL valve until hose evacuation is complete (V11 valve is closed). Failure to do so will result in equipment damage and personal injury.

1. When fuel transfer is complete, set TC/THROTTLE CONTROL switch (Figure 6, Item 8) down to OFF position.
2. Pull out HEMTT V6 valve (Figure 6, Item 3) to de-fuel position.
3. Start hose evacuation process in accordance with TM 9-2320-429-10 and highlighted below.
   a. Set TC/THROTTLE CONTROL switch (Figure 6, Item 8) up to ON position.
   b. Press HI/HIGH IDLE switch (Figure 6, Item 7).
4. Continue to operate HEMTT pump for approximately 2 minutes to evacuate fuel from TRM lower piping.
5. Close V13 valve (Port G) on TRM and continue to operate HEMTT pump for approximately 1 minute to evacuate fuel from 4 in. x 6 ft. (10 cm x 1.82 m) hose.

NOTE

Monitor HEMTT flow meter (Figure 6, Item 2) during hose evacuation.

6. Carefully break hose connection at Port G on TRM to assist in hose evacuation process. Verify vacuum is present.
7. Lift 4 in. x 6 ft. (10 cm x 1.82 m) hose connection at TRM (Port G). Elevate and maintain above Port D (Figure 6, Item 5) height on HEMTT in order to assist in hose evacuation process.
8. Install dust cap on TRM Port G.
9. Close V11 valve (Figure 6, Item 4) (Port D) on HEMTT.
10. Stop HEMTT pump in accordance with TM 9-2320-429-10 and highlighted below.
    a. Let go of HAV HAND ACTUATED CONTROL valve (Figure 6, Item 1) lever.
    b. Pull back on PUMP ENGAGEMENT LEVER (Figure 6, Item 9) until locked.
    c. Set TC/THROTTLE CONTROL switch (Figure 6, Item 8) down to OFF position.
11. Lower 4 in. x 6 ft. (10 cm x 1.82 m) hose connection at TRM and allow any residual fuel to drain in a suitable drip pan.
12. Carefully break 4 in. x 6 ft. (10 cm x 1.82 m) hose connection from 4 in. to 3 in. (10 cm x 7.62 cm) reducer at Port D (Figure 6, Item 5) on HEMTT and allow any residual fuel to drain in suitable drip pan.
13. Remove 4 in. to 3 in. (10 cm x 7.62 cm) reducer from Port D (Figure 6, Item 5) on HEMTT.

CAUTION

Carefully guide HAV HAND ACTUATED CONTROL valve hoses through access hole onto reel. Failure to comply may result in damage to equipment.

14. Rewind HAV HAND ACTUATED CONTROL valve (Figure 6, Item 1) hoses onto reel.
15. Push in V6 valve (Figure 6, Item 3) on HEMTT to “Fuel” position.
16. Close dump valve (Figure 6, Item 6) on HEMTT.
17. Stow 4 in. x 6 ft. (10 cm x 1.82 m) hose.
18. Close manhole covers on HEMTT and TRM.

LONGITUDINAL TRANSFER USING VEHICLE PUMP (HEMTT TO TRM) – CONTINUED

Take Down - Continued

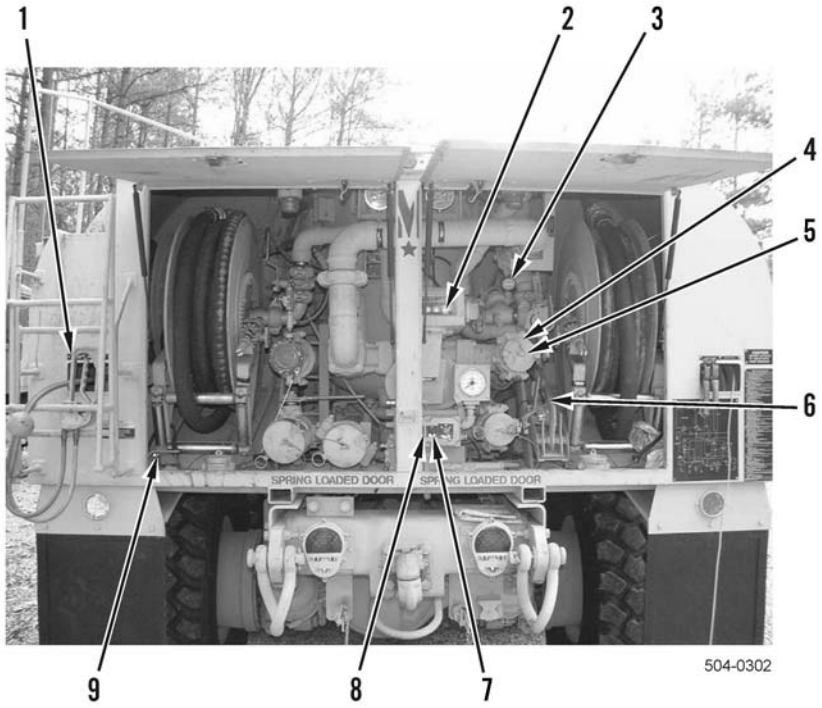


Figure 6. HEMTT Operation.

END OF TASK

TRANSVERSE TRANSFER USING VEHICLE PUMP (TRM TO HEMTT)

Set Up

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

TRANSVERSE TRANSFER USING VEHICLE PUMP (TRM TO HEMTT) – CONTINUED

Set Up - Continued

NOTE

- TRM to HEMTT transfer is not a defuel mission.
- Operation procedures below are typical. References are to TM 9-2320-429-10. Use TM in References list in INITIAL SETUP for HEMTT tanker being used for fueling operations.
- Ensure drip pans are placed at disconnect points.
- Refer to Operator Controls and Indicators (WP 0004) for location of connection points and valves.
- Refer to Figures 7 and 8.

1. Close all valves on HEMTT and TRM.
2. Open manhole covers on HEMTT and TRM.

CAUTION

Length of hoses will depend on position of HEMTT and TRM. Ensure hoses are of sufficient length to rest on ground to prevent damage to equipment.

3. Connect 4 in. (10 cm) hose(s) to HEMTT and TRM.
   a. Connect hose to HEMTT Port B (Figure 7, Item 2) gravity receptacle.
   b. Connect hose to TRM Port B.
4. Connect flange adapter assembly (D1) to HEMTT Port A (Figure 7, Item 1) receptacle (bottom load inlet).
5. Connect 3 in. x 3.5 ft. (7.6 cm x 1.1 m) suction hose (straight end) to HEMTT Port C (Figure 7, Item 3) bulk receptacle.
6. Connect 3 in. x 3.5 ft. (7.6 cm x 1.1 m) suction hose (elbow end) to flange adapter assembly (D1).

Figure 7. Transverse Transfer Using Vehicle Pump (TRM to HEMTT).

7. Open TRM V2 valve.
8. Open TRM V5 valve (Port B).

TRANSVERSE TRANSFER USING VEHICLE PUMP (TRM TO HEMTT) – CONTINUED

Set Up - Continued

9. Position lever on flange adapter assembly (D1) to OPEN position.
10. Open V17 valve (Figure 8, Item 5) on HEMTT.
11. Open V18 valve (Figure 8, Item 2) on HEMTT.
12. Start fuel transfer in accordance with TM 9-2320-429-10 and highlighted below.
    a. Push PUMP ENGAGEMENT LEVER (Figure 8, Item 7) on HEMTT forward.
    b. Set TC/THROTTLE CONTROL switch (Figure 8, Item 4) up to ON position.
    c. Press HI/HIGH IDLE switch (Figure 8, Item 3).
    d. Pull out HAV HAND ACTUATED CONTROL valve (Figure 8, Item 1).

NOTE

HAV HAND ACTUATED CONTROL valve must be open for fuel to flow.

    e. Squeeze and hold lever to open HAV HAND ACTUATED CONTROL valve (Figure 8, Item 1).

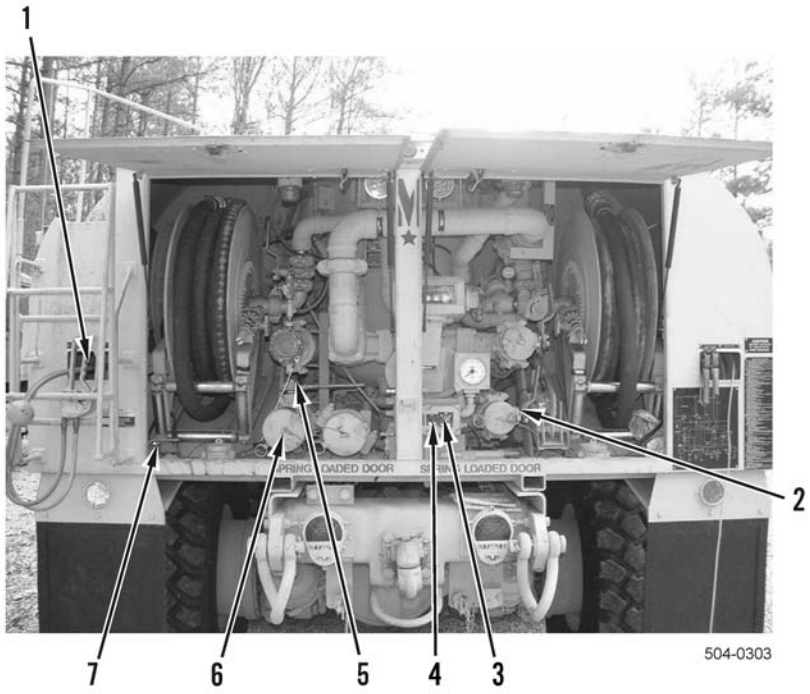


Figure 8. Transverse HEMTT Operation.

Take Down

WARNING

Continue to squeeze and hold HAV HAND ACTUATED CONTROL valve until hose evacuation is complete (V17 valve is closed). Failure to do so will result in equipment damage and personal injury.

1. When fuel transfer is complete, disengage high idle (Figure 8, Item 4) at the HEMTT.
2. Close V2 valve on TRM.

TRANSVERSE TRANSFER USING VEHICLE PUMP (TRM TO HEMTT) – CONTINUED

Take Down - Continued

3. Engage high idle:
   a. Set TC/THROTTLE CONTROL switch (Figure 8, Item 4) up to ON position.
   b. Press HI/HIGH IDLE switch (Figure 8, Item 3).
4. Continue to operate HEMTT pump for approximately 2 minutes to evacuate fuel from TRM lower piping.
5. Close V5 valve (Port B) on TRM and continue to operate HEMTT pump for approximately 2 to 3 minutes to evacuate fuel from hose(s).
6. Momentarily open vacuum breaker at VB1 valve on TRM.
7. Carefully break hose connection at Port B on TRM to assist in hose evacuation process. Verify vacuum is present.
8. Reinstall dust cap at TRM Port B.
9. Lift hose connection at TRM and elevate above B Gravity Port on HEMTT (Figure 9, Item 5) in order to assist in hose evacuation process.
10. Close V17 valve (Figure 9, Item 4) (Port B) at HEMTT.

NOTE

Steps 11 to 19 are used with multiple hoses.

11. Stop HEMTT pump in accordance with TM 9-2320-429-10 and highlighted below.
    a. Let go of HAV HAND ACTUATED CONTROL valve (Figure 9, Item 1) lever.
    b. Pull back on PUMP ENGAGEMENT LEVER (Figure 9, Item 6) until locked.
    c. Set TC/THROTTLE CONTROL switch (Figure 9, Item 3) down to OFF position.
12. Position high end of hose(s) over drip pan and discharge residual fuel in a controlled manner.
13. Separate 4 in. (10 cm) hoses over a drip pan in the following manner:
    a. Carefully break connection and immediately raise end of attached hose to a height above Port B (Figure 9, Item 5) on HEMTT.
    b. Carefully discharge residual fuel from loose 4 in. (10 cm) hose in a drip pan.
14. While maintaining loose end of attached hose at a height above Port B (Figure 9, Item 5) on HEMTT, continue hose evacuation process.
15. Reengage HEMTT pump in accordance with TM 9-2320-429-10 and highlighted below.
    a. Push PUMP ENGAGEMENT LEVER (Figure 9, Item 6) on HEMTT forward.
    b. Set TC/THROTTLE CONTROL (Figure 9, Item 3) switch up to ON position.
    c. Press HI/HIGH IDLE switch (Figure 9, Item 2).
    d. Squeeze and hold lever to open HAV HAND ACTUATED CONTROL valve (Figure 9, Item 1).
16. Open V17 valve (Figure 9, Item 4) (Port B) at HEMTT.

TRANSVERSE TRANSFER USING VEHICLE PUMP (TRM TO HEMTT) – CONTINUED

Take Down - Continued

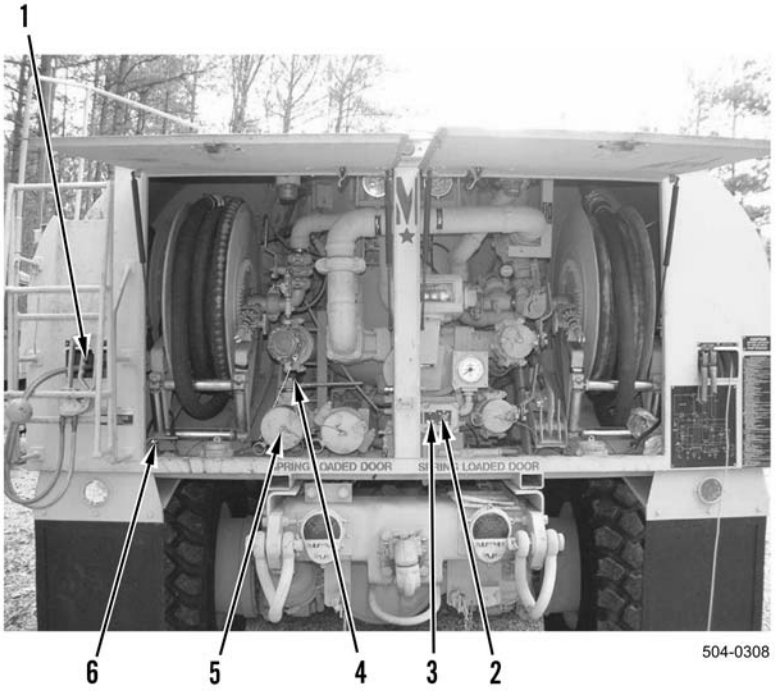


Figure 9. Transverse HEMTT Operation.

TRANSVERSE TRANSFER USING VEHICLE PUMP (TRM TO HEMTT) – CONTINUED

Take Down - Continued

17. Continue to operate HEMTT pump for approximately 2 minutes to evacuate fuel from attached hose.

NOTE

Step 18 may need to be performed multiple times to remove residual fuel from the 4 in. (10 cm) hose.

18. With assistance, maintain open end of 4 in. (10 cm) hose above height of Port B (Figure 10, Item 8) on HEMTT and advance towards HEMTT elevating entire hose above Port B.
19. Close V17 valve (Figure 10, Item 7) (Port B) at HEMTT.
20. Stop HEMTT pump in accordance with TM 9-2320-429-10 and highlighted below.
    a. Let go of HAV HAND ACTUATED CONTROL valve (Figure 10, Item 1) lever.
    b. Pull back on PUMP ENGAGEMENT LEVER (Figure 10, Item 9) until locked.
    c. Set TC/THROTTLE CONTROL switch (Figure 10, Item 6) down to OFF position.

CAUTION

Carefully guide HAV HAND ACTUATED CONTROL valve hoses through access hole onto reel. Failure to comply may result in damage to equipment.

    d. Rewind HAV HAND ACTUATED CONTROL valve hoses onto reel.
21. Position high end of hose over drip pan and discharge residual fuel in a controlled manner.
22. Disconnect the hose from Port B (Figure 10, Item 8) on HEMTT.

WARNING

The hose connection in the following steps will contain fuel. Use care to discharge excess fuel into drip pans and avoid contact. Failure to follow this warning may result in injury to personnel.

23. Close V18 valve (Figure 10, Item 3) on HEMTT.
24. Close D1 valve lever on D1 nozzle.
25. Carefully disconnect the D1 nozzle from Port A (Figure 10, Item 2) on HEMTT.
26. Lower hose D1 end of hose below height of Port C (Figure 10, Item 4).
27. Carefully break connection at Port C (Figure 10, Item 4) on HEMTT and drain remaining fuel into suitable drip pan.
28. Disassemble the 3 in. x 3.5 ft. (7.62 cm x 1 m) hose assembly and stow all hoses.
29. Close manhole covers on HEMTT and TRM.

TRANSVERSE TRANSFER USING VEHICLE PUMP (TRM TO HEMTT) – CONTINUED

Take Down - Continued

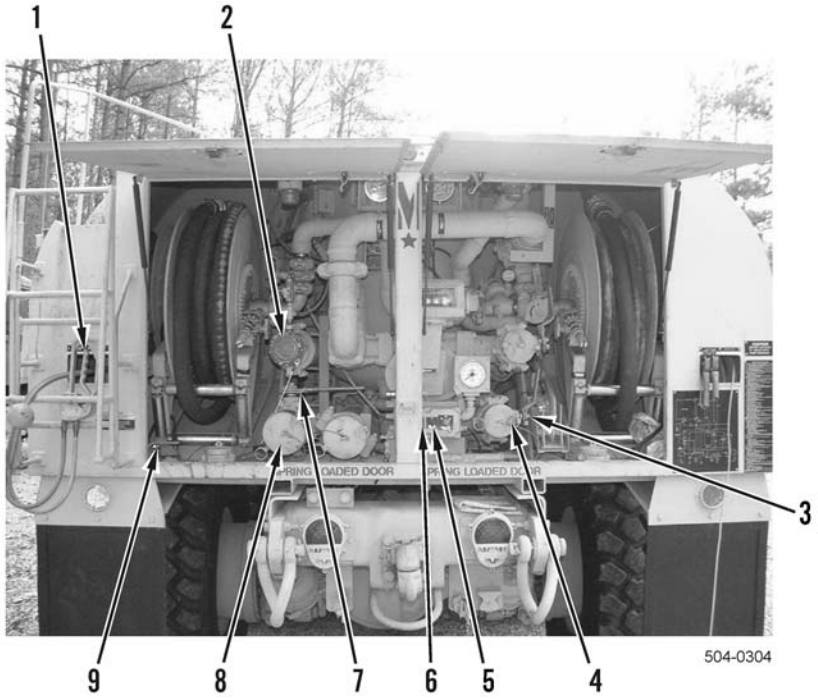


Figure 10. Transverse HEMTT Take Down.

END OF TASK

TRANSVERSE TRANSFER USING VEHICLE PUMP (HEMTT TO TRM)

Set Up

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

TRANSVERSE TRANSFER USING VEHICLE PUMP (HEMTT TO TRM) – CONTINUED

Set Up - Continued

NOTE

- Operation procedures below are typical. References are to TM 9-2320-429-10. Use TM in References list in INITIAL SETUP for HEMTT tanker being used for fueling operations.
- Ensure drip pans are placed at disconnect points.
- Refer to Operator Controls and Indicators (WP 0004) for location of connection points and valves.
- Refer to Figure 11.

1. Close all valves on HEMTT and TRM.
2. Open manhole covers on HEMTT and TRM.
3. Connect 4 in. to 3 in. (10 cm x 7.62 cm) reducer to Port D (Figure 11, Item 5) on HEMTT.

CAUTION

Length of hoses will depend on position of HEMTT and TRM. Ensure hoses are of sufficient length to rest on ground to prevent damage to equipment.

4. Connect 4 in. (10 cm) hoses to HEMTT and TRM.
   a. Connect 4 in. (10 cm) hose to 4 in. to 3 in. (10 cm x 7.62 cm) to reducer at Port D (Figure 11, Item 5) on HEMTT.
   b. Connect 4 in. (10 cm) hose to port B on TRM.
5. Open TRM V5 valve.
6. Open V11 valve (Figure 11, Item 4) (Port D) on HEMTT.
7. Open dump valve (Figure 11, Item 6) on HEMTT.
8. Verify V6 valve (Figure 11, Item 3) on HEMTT is positioned to “Fuel” mode.
9. Start fuel transfer in accordance with TM 9-2320-429-10 and highlighted below.
   a. Push PUMP ENGAGEMENT LEVER (Figure 11, Item 9) on HEMTT forward.
   b. Set TC/THROTTLE CONTROL switch (Figure 11, Item 8) up to ON position.
   c. Press HI/HIGH IDLE switch (Figure 11, Item 7).
   d. Pull out HAV HAND ACTUATED CONTROL valve (Figure 11, Item 1).

NOTE

HAV HAND ACTUATED CONTROL valve must be open for fuel to flow.

   e. Squeeze and hold lever to open HAV HAND ACTUATED CONTROL valve (Figure 11, Item 1).

NOTE

TRM must be on level ground for liquid level switch and tank gauge to operate properly. Liquid level switch detects when fuel has reached maximum fill level of 2,500 gal (9,464 L). When TRM is full, liquid level switch closes V2 valve and stops fuel flow into TRM.

10. To verify operation of liquid level switch, open V6 valve. Fuel flow should stop in approximately 15 seconds.
    a. If liquid level switch is operational, close V6 valve.
    b. If liquid level switch is not operational, close V6 valve and have second 92F observe fuel flow from manhole cover.

TRANSVERSE TRANSFER USING VEHICLE PUMP (HEMTT TO TRM) – CONTINUED

Set Up - Continued

WARNING

Avoid overfilling tank. Spilled fuel cold result in injury or death to personnel.

11. Continue fueling operations.

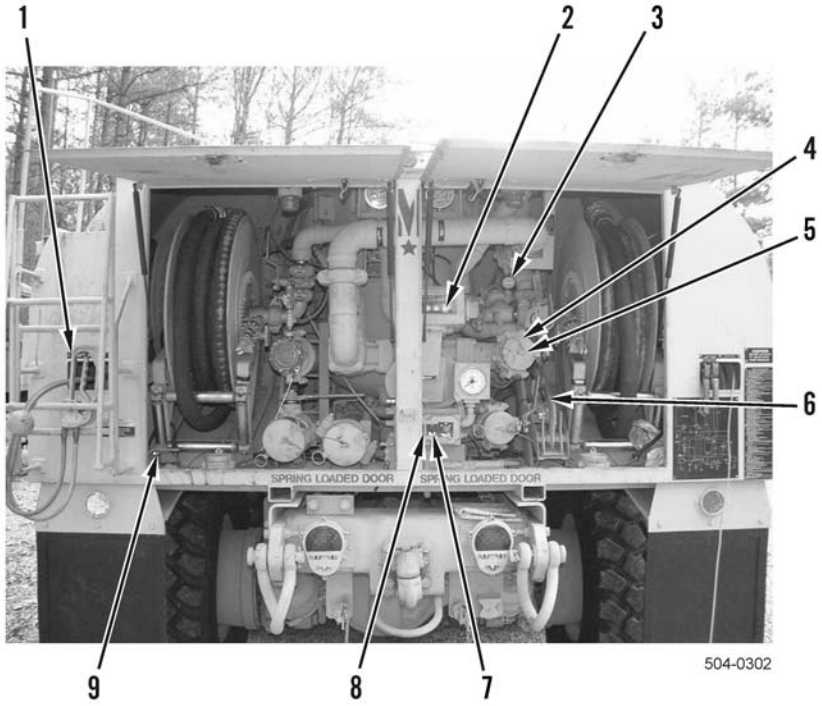


Figure 11. Transverse HEMTT Set Up.

Take Down

WARNING

Continue to squeeze and hold the HAV HAND ACTUATED CONTROL valve until hose evacuation is complete (V11 valve is closed). Failure to do so will result in equipment damage and personal injury.

1. When fuel transfer is complete, set TC/THROTTLE CONTROL switch (Figure 11, Item 8) down to OFF position.
2. Pull out HEMTT V6 valve (Figure 11, Item 3) to de-fuel position.
3. Start hose evacuation process in accordance with TM 9-2320-429-10 and highlighted below.
   a. Set TC/THROTTLE CONTROL switch (Figure 11, Item 8) up to ON position.
   b. Press HI/HIGH IDLE switch (Figure 11, Item 7).
4. Continue to operate HEMTT pump for approximately 2 minutes to evacuate fuel from TRM lower piping.
5. Close V5 valve (Port B) on TRM and continue to operate HEMTT pump for approximately 2 to 3 minutes to evacuate fuel from hose(s).

NOTE

Monitor HEMTT flow meter (Figure 11, Item 2) during hose evacuation.

TRANSVERSE TRANSFER USING VEHICLE PUMP (HEMTT TO TRM) – CONTINUED

Take Down - Continued

6. Momentarily open vacuum breaker at VB1 valve on TRM.
7. Carefully break hose connection at Port B on TRM to assist in hose evacuation process. Verify vacuum is present.
8. Reinstall dust cap at TRM Port B.
9. Lift hose connection at TRM (Port B). Elevate and maintain above Port D (Figure 12, Item 5) height on HEMTT in order to assist in hose evacuation process.
10. Close V11 valve (Figure 12, Item 4) (Port D) at HEMTT.
11. Close dump valve (Figure 12, Item 6) to HEMTT.

NOTE

Steps 12 to 20 are used with multiple hoses.

12. Stop HEMTT pump in accordance with TM 9-2320-429-10 and highlighted below.
    a. Let go of HAV HAND ACTUATED CONTROL valve (Figure 12, Item 1) lever.
    b. Pull back on PUMP ENGAGEMENT LEVER (Figure 12, Item 9) until locked.
    c. Set TC/THROTTLE CONTROL switch (Figure 12, Item 8) down to OFF position.
13. Position high end of hose(s) over drip pan and discharge residual fuel in a controlled manner.
14. Separate 4 in. (10 cm) hoses over drip pan in the following manner:
    a. Carefully break connection and immediately raise end of attached hose to a height above Port D (Figure 12, Item 5) on HEMTT.
    b. Carefully discharge residual fuel from the loose 4 in. (10 cm) hose in drip pan.
15. While maintaining loose end of attached hose at a height above Port D (Figure 12, Item 5) on HEMTT, continue hose evacuation process.
16. Reengage HEMTT pump in accordance with TM 9-2320-429-10 and highlighted below.
    a. Push PUMP ENGAGEMENT LEVER (Figure 12, Item 9) on HEMTT forward.
    b. Set TC/THROTTLE CONTROL switch (Figure 12, Item 8) up to ON position.
    c. Press HI/HIGH IDLE switch (Figure 12, Item 7).
    d. Squeeze and hold lever to open HAV HAND ACTUATED CONTROL valve (Figure 12, Item 1).
17. Open V11 valve (Figure 12, Item 4) (Port D) at HEMTT.
18. Continue to operate HEMTT pump for approximately 2 minutes to evacuate fuel from attached hose.

NOTE

Step 19 may need to be performed multiple times to remove residual fuel from 4 in. (10 cm) hose.

19. With assistance, maintain open end of 4 in. (10 cm) hose above height of Port D (Figure 12, Item 5) on HEMTT and advance towards HEMTT elevating entire hose above Port D.
20. Close V11 valve (Figure 12, Item 4) (Port D) at HEMTT.
21. Stop HEMTT pump in accordance with TM 9-2320-429-10 and highlighted below.
    a. Let go of HAV HAND ACTUATED CONTROL (Figure 12, Item 1) valve lever.
    b. Pull back on PUMP ENGAGEMENT LEVER (Figure 12, Item 9) until locked.
    c. Set TC/THROTTLE CONTROL switch (Figure 12, Item 8) down to OFF position.

TRANSVERSE TRANSFER USING VEHICLE PUMP (HEMTT TO TRM) – CONTINUED

Take Down - Continued

CAUTION

Carefully guide HAV HAND ACTUATED CONTROL valve hoses through access hole onto reel. Failure to comply may result in damage to equipment.

d. Rewind HAV HAND ACTUATED CONTROL valve (Figure 12, Item 1) hoses onto reel.

22. Lower open end of 4 in. (10 cm) hose at TRM over a suitable drip pan to allow any residual fuel to drain.
23. Carefully break 4 in. (10 cm) hose connection from 4 in. to 3 in. (10 cm x 7.62 cm) reducer at Port D (Figure 12, Item 5) on HEMTT and allow any residual fuel to drain into a suitable drip pan.
24. Remove 4 in. to 3 in. (10 cm x 7.62 cm) reducer from Port D (Figure 12, Item 5) on HEMTT.
25. Push in V6 valve (Figure 12, Item 3) on HEMTT to “Fuel” position.
26. Close dump valve (Figure 12, Item 6) on HEMTT.
27. Stow 4 in. (10 cm) hoses.
28. Close manhole covers on HEMTT and TRM.

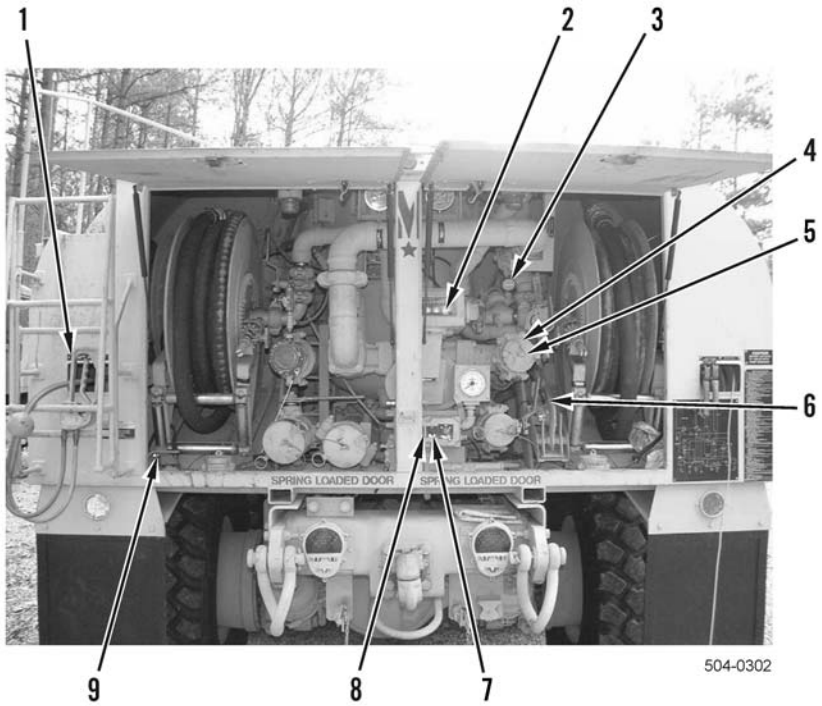


Figure 12. Transverse HEMTT Take Down.

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS OPERATING TRM

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

Personnel Required

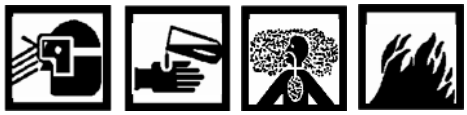
Petroleum Supply Specialist 92F (2)

References

MIL-STD-3004A1
FM 10-67-1
WP 0002
WP 0006 thru WP 0011
WP 0022

TRM OPERATING PROCEDURES

WARNING



- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Failure to comply could result in injury or death to personnel.

CAUTION

Perform quality surveillance operations on all bulk fuel receipts and TRM fuel issues, per MIL-STD-3004A1, Quality Surveillance for Fuels, Lubricants, and Related Products to prevent damage to equipment.

NOTE

Retail issue is defined as any issue that goes into consuming equipment or is packaged. Packaged fuel can be in 5 gal. (18.93 L) cans, 55 gal. drums (208.2 L), or 500 gal. (1,892.71 L) collapsible drums.

1. Bulk fuel receipt:

   Receive fuel from tank truck (WP 0006 thru WP 0008).
2. Store fuel:
   a. Shut down operations (WP 0022).
   b. Tank has storage capacity of 2,500 gal. (9,464 L) (WP 0002).
3. Issue fuel:
   a. Bulk issue (WP 0011).
   b. Retail issue (WP 0009 and WP 0010).

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS CHECK FUEL LEVEL WITH GAUGE STICK

INITIAL SETUP

Tools and Special Tools

Gauge stick (WP 0152, Table 2, Item 11)

References

FM 10-67-1

Materials/Parts

Cloth, cleaning (WP 0153, Item 5)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

Equipment Condition

TRM shut down (WP 0022)

Personnel Required

Petroleum Supply Specialist 92F (2)

CHECK FUEL LEVEL

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

CHECK FUEL LEVEL – CONTINUED

1. Unhook spring snap clip (Figure 1, Item 1) and remove cover (Figure 1, Item 3) from tube (Figure 1, Item 2).

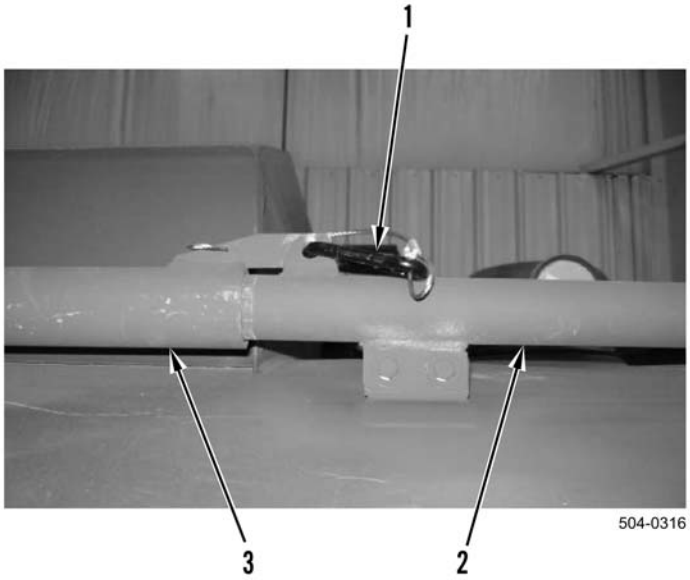


Figure 1. Stowage Tube Assembly.

2. Open manhole cover (Figure 2, Item 1).
3. Remove gauge stick (Figure 2, Item 3) from tube (Figure 2, Item 2).
4. Lower gauge stick (Figure 2, Item 3) into tank until gauge stick touches bottom of tank.
5. Remove gauge stick (Figure 2, Item 3) and check marking for fuel level in tank.
6. Wipe off gauge stick (Figure 2, Item 3) and slide it into tube (Figure 2, Item 2).
7. Close manhole cover (Figure 2, Item 1).

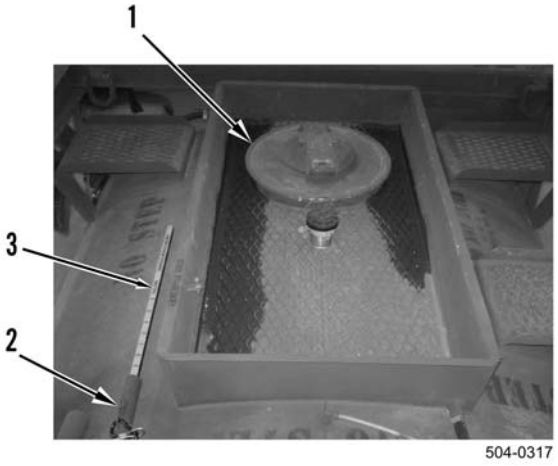


Figure 2. Checking Fuel Level.

8. Install cover (Figure 1, Item 3) on tube (Figure 1, Item 2) and hook spring snap clip (Figure 1, Item 1).

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS DRAIN TRM
Drain TRM Tank Assembly Using Port B, Drain TRM Tank Assembly Using Port A

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)
Camlock adapter (WP 0152, Table 1, Item 6)

Personnel Required

Petroleum Supply Specialist 92F (2)

References

FM 10-67-1

Equipment Condition

TRM shut down (WP 0022)

DRAIN TRM TANK ASSEMBLY USING PORT B

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

NOTE

Ensure drip pans are placed at disconnect points.

1. Close all valves.
2. Connect 4 in. suction hoses as necessary, and connect male end of one hose to Port B.
3. Connect camlock adapter to end of suction hose.
4. Connect camlock adapter to external transfer pump.
5. Open manhole cover and remove cap from the vapor recovery line.
6. Open V5 valve.
7. Open V2 valve.
8. Open valve on camlock adapter and start external transfer pump to begin defueling operations through Port B.
9. Close V2 valve.
10. Close V5 valve.
11. Initiate hose evacuation using external transfer pump to continue defueling operations.

DRAIN TRM TANK ASSEMBLY USING PORT B – CONTINUED

12. Place drip pan under vacuum breaker VB1 valve and momentarily open valve.
13. Carefully break 4 in. hose connection at Port B to assist hose evacuation. Verify vacuum is present.
14. Lift hose end disconnected from Port B above height of supply source for approximately two minutes to assist in hose evacuation.
15. After hoses are evacuated, close camlock adaptor at external transfer pump.
16. Close supply source valve and shut off external transfer pump.
17. Carefully discharge residual fuel from 4 in. hose into drip pans.
18. Carefully disconnect hose from supply source and discharge any remaining fuel into drip pans.
19. Replace dust cap and plugs on hose, Port B, and vapor recovery line.
20. Close manhole cover.

END OF TASK

DRAIN TRM TANK ASSEMBLY USING PORT A

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

NOTE

Ensure drip pans are placed at disconnect points.

1. Close all valves.
2. Connect D1 nozzle from external source to Port A.
3. Open manhole cover and remove cap from the vapor recovery line.
4. Open V2 valve.
5. Start external transfer pump and begin draining operation.
6. After draining is complete, evacuate hoses using external transfer pump.
7. After hoses are evacuated, close V2 valve.
8. Disconnect D1 nozzle from Port A.
9. Close manhole cover and replace cap on vapor recovery line.

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS ROLLER ASSEMBLY HARD SURFACE EMPLACEMENT/RETRIEVAL

Remove Roller From Storage Position, Emplace Roller In Operational Position, Retrieve Roller From Operational Position and Place in Storage Position

INITIAL SETUP

Personnel Required	Equipment Condition
Petroleum Supply Specialist 92F (2)	TRM shut down (WP 0022) TRM mounted on PLS/LHS (WP 0013)

REMOVE ROLLER FROM STORAGE POSITION

1. Unlock two pin locks (Figure 1, Item 1) securing two pins (Figure 1, Item 4) in roller assembly (Figure 1, Item 3) and TRM frame (Figure 1, Item 5).
2. Remove two pins (Figure 1, Item 4) with lanyards (Figure 1, Item 2) from roller assembly (Figure 1, Item 3) and TRM frame (Figure 1, Item 5).
3. Remove roller assembly (Figure 1, Item 3) from TRM frame (Figure 1, Item 5).

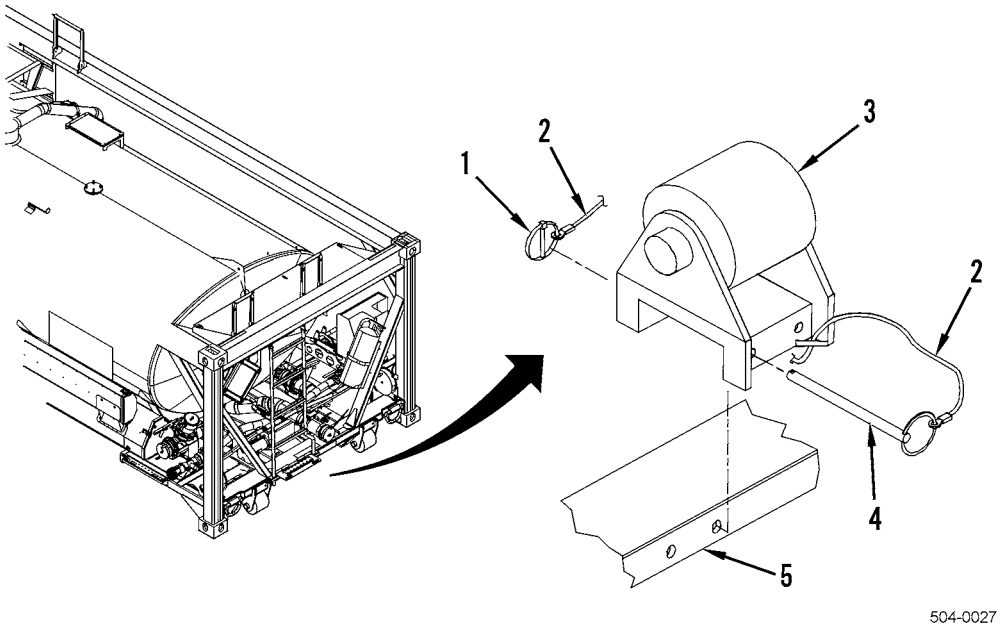


Figure 1. Remove Roller Assembly.

4. Perform steps 1, 2, and 3 on the second roller assembly.

END OF TASK

EMPLACE ROLLER IN OPERATIONAL POSITION

1. Position roller assembly (Figure 2, Item 4) under TRM frame (Figure 2, Item 1) with roller toward rear of TRM.
2. Install two pins (Figure 2, Item 2) through holes in roller assembly (Figure 2, Item 4) and TRM frame (Figure 2, Item 1).
3. Route two lanyards (Figure 2, Item 3) over TRM frame (Figure 2, Item 1).
4. Lock two pin locks (Figure 2, Item 5) securing pins (Figure 2, Item 2) in roller assembly (Figure 2, Item 4) and TRM frame (Figure 2, Item 1).

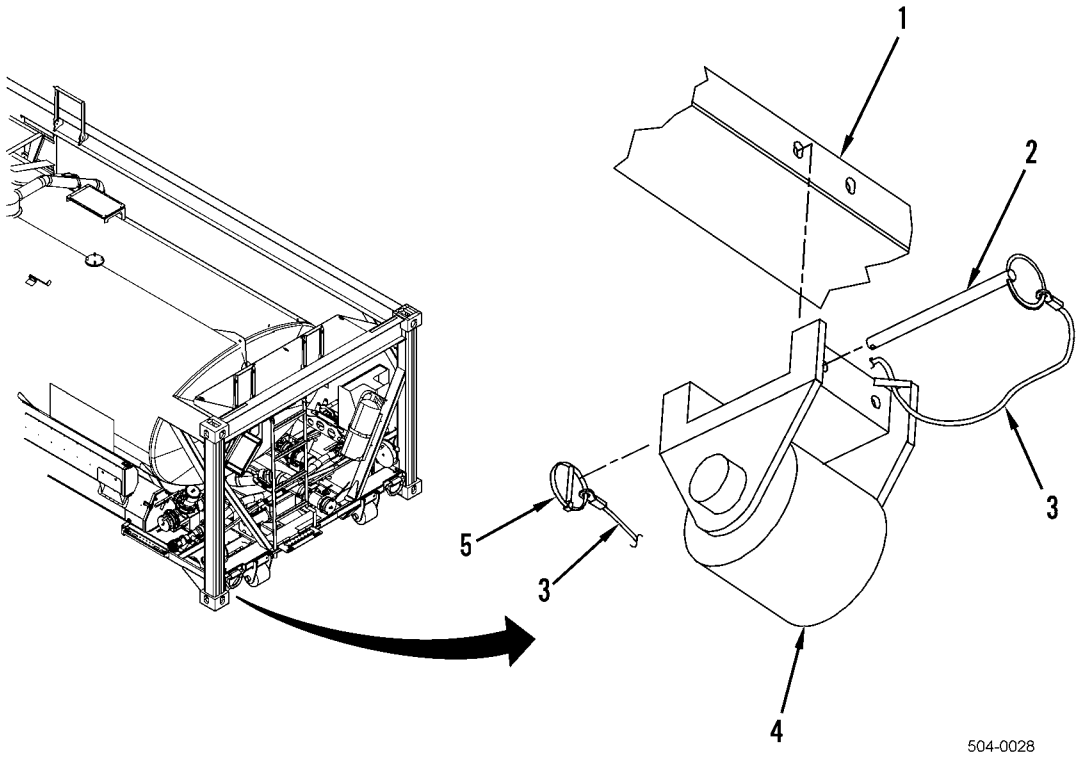


Figure 2. Emplace Roller Assembly.

5. Perform steps 1 thru 4 on the second roller assembly.

END OF TASK

RETRIEVE ROLLER FROM OPERATIONAL POSITION AND PLACE IN STORAGE POSITION

1. Unlock two pin locks (Figure 2, Item 5) securing two pins (Figure 2, Item 2) in roller assembly (Figure 2, Item 4) and TRM frame (Figure 2, Item 1).
2. Remove two pins (Figure 2, Item 2) and two lanyards (Figure 2, Item 3) from roller assembly (Figure 2, Item 4) and TRM frame (Figure 2, Item 1).
3. Remove roller assembly (Figure 2, Item 4) from TRM frame (Figure 2, Item 1).
4. Position roller assembly (Figure 3, Item 3) in storage position.
5. Route two lanyards (Figure 3, Item 2) under TRM frame (Figure 3, Item 5).
6. Install two pins (Figure 3, Item 4); one pin passes through hole in roller assembly (Figure 3, Item 3) and TRM frame (Figure 3, Item 5), and second through hole in TRM frame.
7. Lock two pin locks (Figure 3, Item 1) securing pins (Figure 3, Item 4) in roller assembly (Figure 3, Item 3) and TRM frame (Figure 3, Item 5).

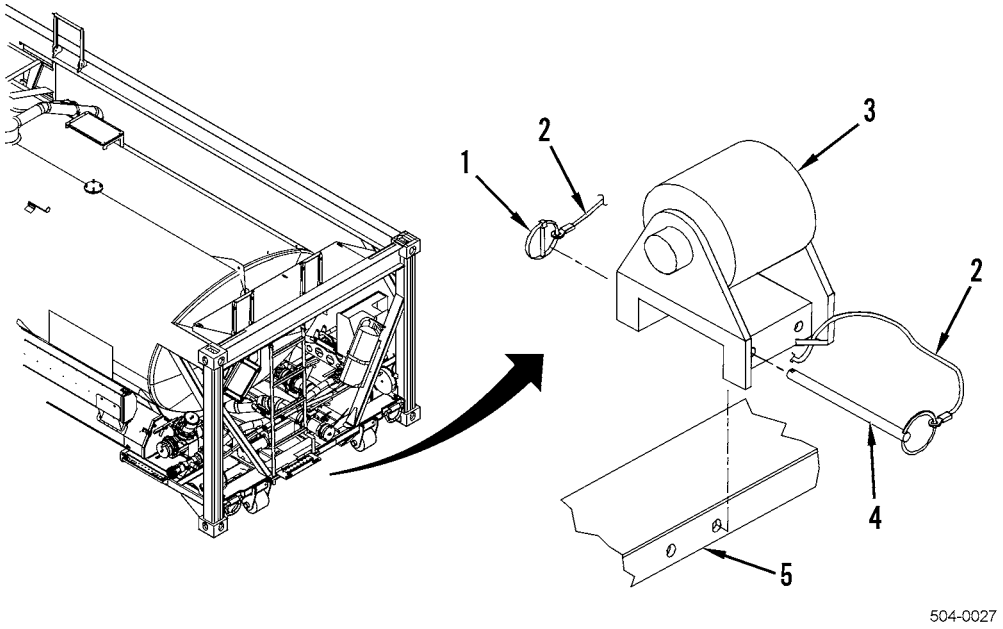


Figure 3. Install Roller Assembly.

8. Perform steps 1 thru 7 on the second roller assembly.

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

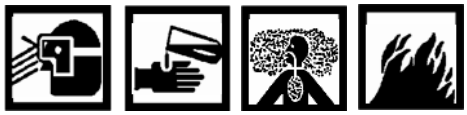
OPERATION UNDER USUAL CONDITIONS LADDER REMOVAL/INSTALLATION
Removal, Installation

INITIAL SETUP

Personnel Required	Equipment Condition
Petroleum Supply Specialist 92F (2)	TRM shut down (WP 0022) TRM mounted on PLS trailer (WP 0013)

REMOVAL

WARNING



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NOTE

The ladder provides easy access to the TRM deck.

1. Release two clamping catches (Figure 1, Item 1) and remove ladder (Figure 1, Item 2) from brackets (Figure 1, Item 3).

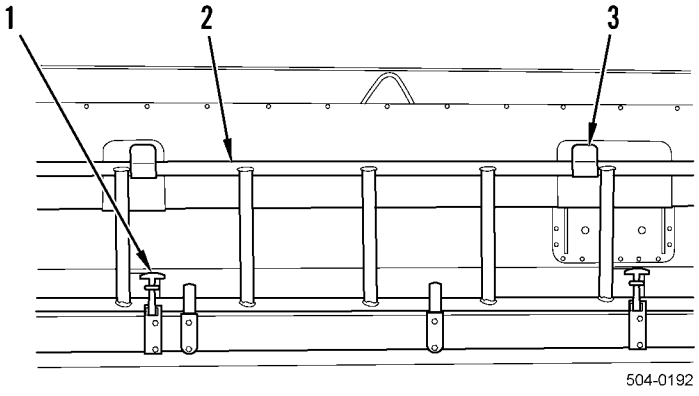


Figure 1. Ladder.

REMOVAL – CONTINUED

2. Insert ladder hooks (Figure 2, Item 2) in ladder mount slots (Figure 2, Item 1).

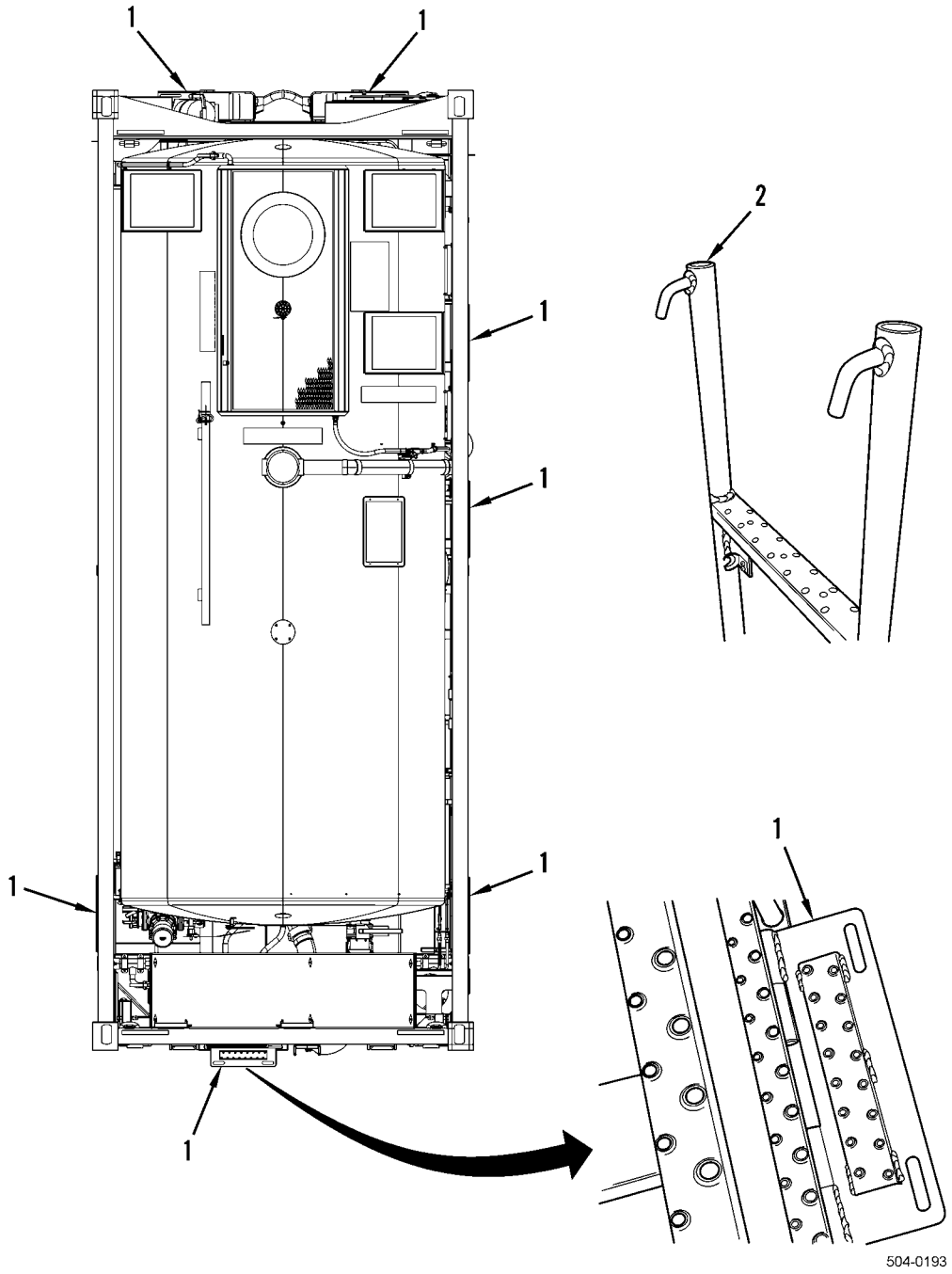


Figure 2. Ladder Mounts.

END OF TASK

INSTALLATION

Stow ladder (Figure 3, Item 2) on brackets (Figure 3, Item 3) and secure with two clamping catches (Figure 3, Item 1).

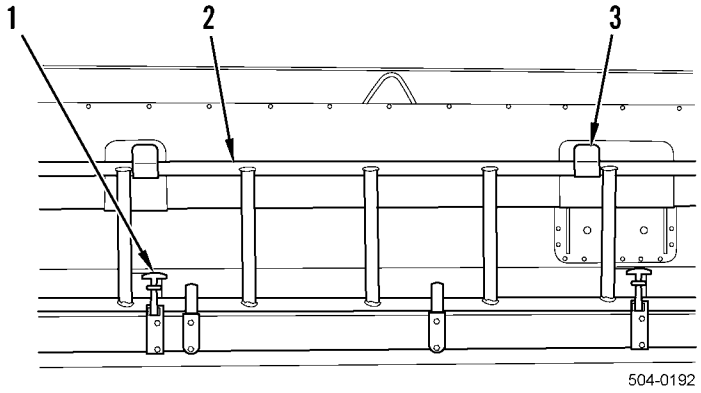


Figure 3. Ladder.

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS POSITION MANHOLE COVER FOR TRANSPORT/OPERATION

Position Manhole Cover For Transport, Railcar Movement, Aircraft Movement, Position Manhole Cover For Operation

INITIAL SETUP

Tools and Special Tools

Hammer, hand (WP 0152, Table 2, Item 2)
Wrench, box and open end (WP 0152, Table 2, Item 9)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Respirator, air filtering (WP 0153, Item 16)

Personnel Required

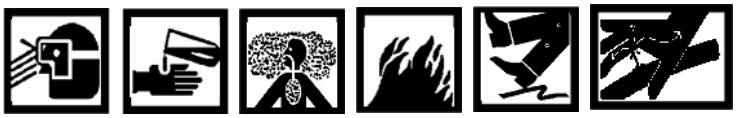
Petroleum Supply Specialist 92F (2)

References

WP 0002
WP 0021

POSITION MANHOLE COVER FOR TRANSPORT

WARNING



- Goggles, gloves, and respirator must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

NOTE

Transporter cover is located on right side of TRM frame (WP 0002).

POSITION MANHOLE COVER FOR TRANSPORT – CONTINUED

1. Lift latch (Figure 1, Item 2) and open manhole cover (Figure 1, Item 3) enough to allow pressure to escape.
2. Close manhole cover.
3. Using 9/16 in. wrench, remove nut (Figure 1, Item 8), washer (Figure 1, Item 7), and capscrew (Figure 1, Item 6) from clamp (Figure 1, Item 1).
4. Remove clamp (Figure 1, Item 1) and manhole cover (Figure 1, Item 3) from tank assembly (Figure 1, Item 5).
5. Ensure transporter cover seal is serviceable and in place. If seal is unserviceable or missing, notify Field Maintenance.
6. Align and install transporter cover (Figure 1, Item 4) with vent side up and clamp (Figure 1, Item 1) on tank assembly (Figure 1, Item 5).
7. Install capscrew (Figure 1, Item 6), washer (Figure 1, Item 7), and nut (Figure 1, Item 8) in clamp (Figure 1, Item 1).
8. Tighten nut (Figure 1, Item 8) to secure clamp (Figure 1, Item 1) on transporter cover (Figure 1, Item 4). Use hammer to tap the clamp while tightening the nut.

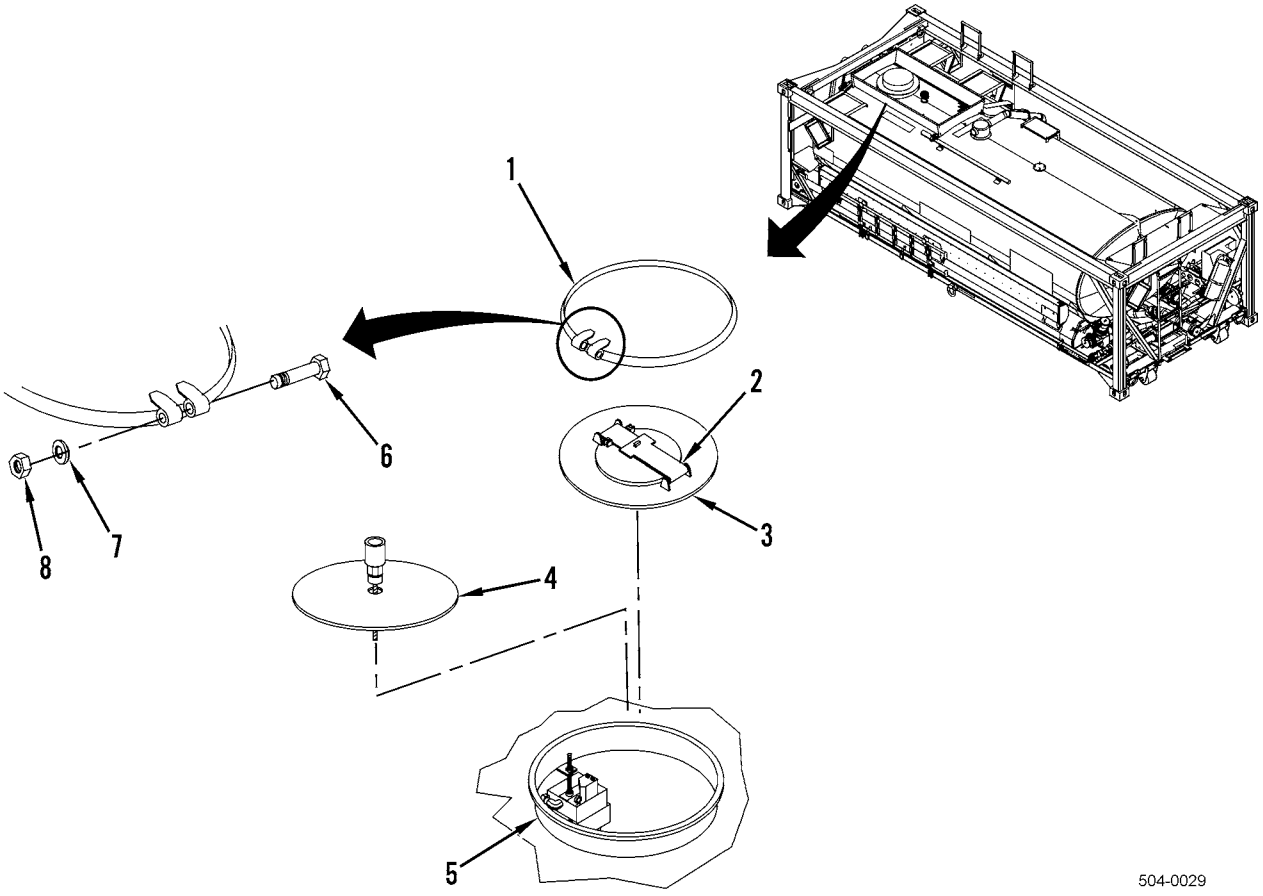


Figure 1. Manhole and Transporter Cover.

9. Stow manhole cover on right side of TRM frame (WP 0002).

END OF TASK

RAILCAR MOVEMENT

NOTE

If TRM is EMPTY, it can be transported without transporter cover modification.

1. Install transporter cover per steps 1 thru 9 to transport TRM filled with fuel.
2. Secure TRM on railcar per local and unit rail transportation SOPs.

END OF TASK

AIRCRAFT MOVEMENT

NOTE

If TRM is EMPTY, it can be transported without transporter cover modification.

1. Install transporter cover per steps 1 thru 9 to transport TRM filled with fuel.
2. Secure TRM on aircraft per local and unit aircraft transportation SOPs.
3. To purge tank, refer to WP 0021.

END OF TASK

POSITION MANHOLE COVER FOR OPERATION

WARNING

- Goggles, gloves, and respirator must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

1. Remove nut (Figure 1, Item 8), washer (Figure 1, Item 7), and capscrew (Figure 1, Item 6) from clamp (Figure 1, Item 1).
2. Remove clamp (Figure 1, Item 1) and transporter cover (Figure 1, Item 4) from tank assembly (Figure 1, Item 5).
3. Ensure manhole cover seal is serviceable and in place. If seal is unserviceable or missing, notify Field Maintenance.
4. Align and install manhole cover (Figure 1, Item 3) and clamp (Figure 1, Item 1) on tank assembly (Figure 1, Item 5).
5. Install capscrew (Figure 1, Item 6), washer (Figure 1, Item 7), and nut (Figure 1, Item 8).
6. Tighten nut (Figure 1, Item 8) to secure clamp (Figure 1, Item 1) on manhole cover (Figure 1, Item 3) and use hammer to tap clamp while tightening nut.

POSITION MANHOLE COVER FOR OPERATION – CONTINUED

7. Stow transporter cover on right side of TRM frame (WP 0002).

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS PREPARATION FOR MOVEMENT
Purging

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Cleaning compound, solvent-detergent (WP 0153, Item 3)

Personnel Required

Petroleum Supply Specialist 92F (2)

Equipment Condition

TRM drained of fuel and all hoses drained and evacuated (WP 0017)

PURGING

WARNING

- No operator or field level maintenance personnel are authorized inside tank.
- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- All vapor-freeing work by any method should be performed outdoors, remote from vehicles and other known sources of ignition. Tank unit must be stationed where flammable vapors will not blow or drift indoors.
- Do not wear wool, nylon, silk, rayon, or other clothing having a tendency to generate static electricity.
- Wear clean cotton clothing with no metal buttons, zippers or fasteners. Remove all contents from pockets.
- Wear rubber boots and rubber gloves.
- Use cotton waste for cleaning purposes; other material may generate static electricity.
- Failure to comply with any of the above warnings may result in injury or death to personnel.

NOTE

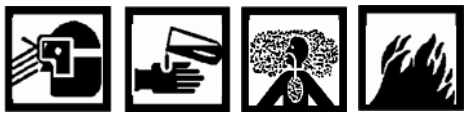
The following procedure should be followed when placing the TRM in long term storage. Under usual conditions, completely draining the TRM (WP 0017) is sufficient for air or rail transport. If complete purging is required in order to repair, clean, paint, store, change material, or ship the TRM, the following procedures shall be used.

PURGING – CONTINUED

Chemical Method

1. Close or seal all valve and drain points.
2. Open manhole cover.
3. Fill tank with cold water and allow to overflow for five minutes or until traces of flammable material are removed.
4. Drain tank completely.

WARNING



Solvent-detergent cleaning compound is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well ventilated areas. Keep away from open flames and other sources of ignition. Failure to comply my cause injury or death to personnel.

CAUTION

Insufficient amount of solvent-detergent cleaning compound will result in an incomplete purging. Once purging has begun, do not stop until process is complete.

5. Add to tank approximately 8 gallons of solvent-detergent cleaning compound.
6. Fill tank to top with water. Do not overflow.
7. Close manhole cover.
8. Agitate solution with water inside tank (i.e., drive around for a minimum of 40 minutes).
9. Open manhole cover.
10. Drain tank of all solution as quickly as possible by opening all valves and drain points (WP 0017).
11. Fill tank with cold water and allow to overflow for 5 minutes or until water is clear.
12. Drain tank completely and as quickly as possible by opening all valves and drain points (WP 0017).
13. Close manhole cover.

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER USUAL CONDITIONS SHUT DOWN

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

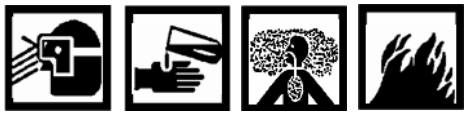
Personnel Required

Petroleum Supply Specialist 92F (2)

References

FM 10-67-1
WP 0012
WP 0030
WP 0031

WARNING



- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Follow all fuel operations in FM 10-67-1. Ensure grounding connections are made properly before any fueling operations. Stop fueling operations immediately at the first sign of a leak or malfunction.
- Failure to comply could result in injury or death to personnel.

1. Stop fueling operations.
2. Evacuate hoses (WP 0012).
3. Close all valves and manhole cover.
4. Disconnect hoses and replace dust caps and plugs on adapters, hoses, and ports.
5. Perform AFTER PMCS (WP 0030 and WP 0031).

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

OPERATION UNDER UNUSUAL CONDITIONS SLAVE ASSISTING FUEL PUMP ASSEMBLY

INITIAL SETUP

Materials/Parts
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

References
WP 0009
WP 0012

Personnel Required
Petroleum Supply Specialist 92F

Equipment Condition
TRM prepared for use (WP 0005)

WARNING

- Use NATO slave cable that does not have loose or missing insulation.
- Do not proceed if suitable cable is not available.
- Do not use civilian-type jumper cables.
- Do not allow “dead” TRM and “live” vehicle come in contact with each other at any time during slave assisting.
- Failure to comply could result in injury or death to personnel.

NOTE

Use NATO slave cables from available vehicle to conduct slave operations.

1. Position the vehicle to connect slave cable to the TRM’s NATO slave connector. Park vehicle, but ensure it does not touch the TRM.
2. Shut off engine of vehicle.
3. Remove caps from slave receptacle on vehicle and TRM’s NATO slave connector.
4. Plug NATO slave cable connectors into slave receptacle on vehicle and TRM’s NATO slave connector.
5. Start vehicle engine.
6. Start fuel pump assembly and operate as required for fuel discharge (WP 0009) or hose evacuation (WP 0012).
7. Upon completion of pump operations, remove the NATO slave cables in the reverse order that they were installed.
8. Replace caps on vehicle slave receptacle and TRM NATO slave connector.

END OF TASK

END OF WORK PACKAGE

OPERATOR MAINTENANCE

OPERATION UNDER UNUSUAL CONDITIONS UNUSUAL ENVIRONMENT/WEATHER

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

Personnel Required

Petroleum Supply Specialist 92F (2)

References

FM 9-207
FM 31-70

References - Continued

FM 31-71
MIL-STD-3004A1
WP 0015
WP 0026
WP 0030
WP 0031
WP 0034

UNUSUAL ENVIRONMENT/WEATHER

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- When operating the TRM in temperatures of 100ºF (38ºC) or higher, take extra care to minimize the possibility of an explosion and fire.
- Fuels evaporate very quickly. Fuel contact of skin can quickly lower the temperature of exposed skin making the area susceptible to frostbite. Prevent leakage of fuel onto bare skin of personnel.
- When operating the TRM in temperatures down to -25ºF (-31ºC), take extra care to minimize the possibility of frostbite to personnel.
- Failure to comply could result in injury or death to personnel.

CAUTION

The TRM is designed to operate normally within a wide range of climatic conditions. However, some extreme conditions require special operating and servicing procedures to prevent damage to the equipment.

UNUSUAL ENVIRONMENT/WEATHER – CONTINUED

1. For operation in extreme heat conditions, perform the following steps:
   a. Clean up fuel spills and drips in a timely manner (WP 0026). The accumulation of evaporating fuel can form dangerous explosive fumes.
   b. Check battery levels daily (WP 0031).
2. For operation in extreme cold conditions, perform the following steps:
   a. Remove any fuel from exposed skin as soon as possible.
   b. Remove all snow and ice from TRM as soon as possible.
   c. Conduct BEFORE, DURING, and AFTER PMCS procedures (WP 0030 and WP 0031) as needed.
   d. Prepare TRM for severe cold weather as prescribed in FM 9-207. Refer to FM 31-70 and FM 31-71 for additional information on operating the TRM in cold weather.
3. For operation in sandy or dusty conditions, perform the following steps:
   a. Ensure the insides of all TRM components are clean before connecting components during setup or assembly.
   b. Clean areas of dust and sand accumulation daily. Perform required operator maintenance procedures (WP 0034) if loose connections or leaks occur.
   c. Inspect often per MIL-STD-3004A1, Quality Surveillance for Fuels, Lubricants, and Related Products, for fuel contamination (WP 0015).
   d. Ensure all fitting, hose, and piping connections are secure.

CAUTION

Accumulation of salt can cause corrosion and damage to equipment.

4. For operation in salt air and sea spray conditions perform the following steps:
   a. Clean all exposed surfaces frequently.
   b. Rinse all exposed surfaces with fresh water to remove salt.

END OF TASK

END OF WORK PACKAGE

OPERATOR MAINTENANCE

OPERATION UNDER UNUSUAL CONDITIONS CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR (CBRN) DECONTAMINATION

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

References

FM 3-11.4
FM 3-11.5

Personnel Required

Petroleum Supply Specialist 92F (2)

INTERIM CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR (CBRN) DECONTAMINATION PROCEDURES

WARNING

In the event equipment has been exposed to chemical, biological, radiological, and nuclear decontamination warfare, the equipment shall be handled with extreme caution and decontaminated in accordance with FM 3-11.5, NBC Decontamination. Unprotected personnel can experience injury or death if residual toxic agents or radioactive materials are present. If equipment is exposed to radioactive, biological, or chemical agents, personnel must wear protective mask, hood, protective overgarments, chemical gloves, and chemical boots in accordance with Mission Oriented Protective Posture (MOPP) level prescribed by the Officer In Charge (OIC) or Non-Commissioned Officer In Charge (NCOIC). MOPP analysis and levels are described in detail in FM 3-11.4, Multiservice Tactics, Techniques, and Procedures for NBC Protection. Personnel should contact a unit that has capability for freshwater wash down. The unit can also assist in the evacuation of soldiers who have been exposed and provide space and shelter for exchanging MOPP suits. Failure to comply could result in injury or death to personnel.

1. Decontaminate equipment per FM 3-11.5.
2. Perform operational check of all equipment after decontamination.

END OF TASK

END OF WORK PACKAGE

OPERATOR MAINTENANCE

EMERGENCY PROCEDURES – IMMEDIATE ACTIONS

Emergency Procedures - Fire, Immediate Action For Fuel Leaking During Operation, Emergency Procedures - Fuel Spill Containment and Cleanup

INITIAL SETUP

Tools and Special Tools

Kit, fuel spill control
(WP 0152, Table 1, Item 9)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

Personnel Required

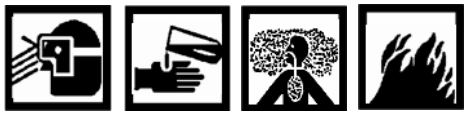
Petroleum Supply Specialist 92F

References

AR 200-1

EMERGENCY PROCEDURES - FIRE

WARNING



Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Pull closest EMERGENCY STOP handle on TRM.
2. Activate and employ fire extinguishers.
3. If possible, shut down the fuel pump assembly and external transfer pump.
4. If possible, close all valves.
5. After the fire is extinguished, check TRM for damage.
6. Contact Field Maintenance for replacement of any components that are damaged by fire.
7. Clean up fuel spills and dispose of contaminated fuel per AR 200-1, Environmental Protection and Enhancement, and local SOP.

END OF TASK

IMMEDIATE ACTION FOR FUEL LEAKING DURING OPERATION

WARNING

Fuel under pressure has sufficient force to penetrate the skin, causing serious injury to personnel. Do not approach the leak until all pressure is removed from the system.

1. Pull closest EMERGENCY STOP handle on TRM.
2. When pressure is relieved, close valves on both sides of fuel leak.
3. Contact Field Maintenance to repair or replace damaged components, as required.

END OF TASK

EMERGENCY PROCEDURES - FUEL SPILL CONTAINMENT AND CLEANUP

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

NOTE

The following information and instruction is general guidance for fuel spill containment and clean-up actions. Specific requirements and guidance is provided in the unit's Spill Prevention, Control, and Countermeasures (SPCC) plan. The SPCC plan establishes procedures, methods, equipment, and other criteria to prevent fuel spills, and the conduct of spill clean-up.

1. AR 200-1 prescribes Department of the Army (DA) responsibilities, policies and procedures to preserve, protect and restore the quality of the environment. It incorporates all applicable statutory and regulatory requirements in the area of hazardous substances spill contingency planning, control and emergency response, solid and hazardous waste management and environmental restoration for Class III operations. Management of fuel spills, use of the fuel spill control kit, disposal of contaminated kit material and the restoration of the environment after a spill are the responsibility of the installation, activity and unit commander in consultation with AR 200-1 and environmental authorities.
2. Every spill, no matter how small, should be reported by Class III point operators and investigated in accordance with AR 200-1 so that the cause can be determined and future spills prevented. Every spill should be treated as a potential source of soil contamination and fire. Cleanup procedures are described below.

   Detailed instructions must be given by the responsible environmental authority. Each spill must be treated as an individual case because of size, type of fuel involved, wind conditions, weather, equipment available, possible involvement of vehicles and other similar variables.

EMERGENCY PROCEDURES - FUEL SPILL CONTAINMENT AND CLEANUP – CONTINUED

NOTE

Fuel spills are classified by the area covered by the spill. The seriousness of a fuel spill is determined by the area of contact between the fuel, soil and air. It is on or above the surface that a flammable, vapor-air mixture can form and fire can take place. The number of square feet covered by the spill is more important than the amount of fuel spilled.

3. Start immediate cleanup. A quick cleanup slows down the spread of contamination and saves on cleanup costs. Absorb spilled fuel or allow it to evaporate before using the spill area for operation. In general, the following are basic actions that should be considered and carried out if spills occur:
   a. Determine the size of the fuel spill.
      (1) A small priming spill is one that covers an area less than 18 in. (45.7 cm) in diameter.
      (2) A small spill is one that is less than 10 ft (3.05 m) in diameter or that covers less than 50 sq-ft (4.65 sq-m). It is not a continuous spill (tank leak).
      (3) A large spill is one that is larger than 10 ft (3.05 m) in diameter, one that covers an area larger than 50 sq-ft (4.65 sq-m) or one that is continuous (a tank leak). Perform the following actions for all fuel spills.
   b. Stop the flow of fuel, if possible. Examples of stopping a spill include shutting off the valves in a hoseline and closing secondary containment valves around storage tanks.
   c. Contain the spill. Examples of containing a spill include constructing berms and cut-off trenches and using the fuel spill control kit's enclosed oil absorbents. Do not contain gasoline or other volatile chemical spills. Instead, disperse the volatile fuel away from equipment and let it evaporate.
   d. Evacuate personnel from vehicle involved.
   e. Shut down operations in the area of large spills.
   f. Notify firefighting and environmental support activities.
   g. Check thoroughly for vapors trapped in equipment used in the Class III fuel point operations, such as pump assemblies, filter-separators and fuel tank vehicles. Ensure vapors have dissipated before the equipment and vehicles are returned to service.
   h. Start immediate cleanup.
   i. Use the fuel spill control kit's bag of granular absorbent to spread over small priming fuel spills.
   j. Position a fireguard beside the spill area with a fire extinguisher until the cleanup operation is completed.
4. Perform the following actions for small fuel spills.
   a. Stop operation at the spill site and post a fireguard with a fire extinguisher by the spill.
   b. Use the fuel spill control kit's 10 ft long (3.05 m) enclosed oil absorbents, which are filled with loose absorbent material, to contain the spill by forming a dike around it.
5. Perform the following actions for large fuel spills.

   At a permanent installation or large temporary refueling point where there is a fire department or fire brigade, call the firefighters immediately and stop operations in the area. As soon as the fire assistance has been called, the actions described below should be performed as necessary.
   a. If the fuel is MOGAS or JP-4, a large spill should be blanketed with fire extinguisher foam as soon as possible to reduce danger of fire or to put out the fire if one exists.
   b. It may be necessary to have all personnel leave a vehicle if the spill is at or near vehicle. No one other than authorized personnel should move throughout the spill area. Any person whose clothes come in contact with fuel should remove contaminated clothing and wash them with soap and water. Any person whose clothes are on fire should roll or be rolled on the ground to put out the fire or be wrapped in a blanket to smother the flames.

EMERGENCY PROCEDURES - FUEL SPILL CONTAINMENT AND CLEANUP – CONTINUED

c. Mobile refueling equipment may be the largest single source of fuel near the spill. If the fuel spill has not caught fire, starting the engine of a refueler or other vehicle could supply a spark that would ignite the spill or vapors. The decision on what procedure is least hazardous – driving the refueler away or not starting the engine – must be made on the spot by the person in charge. If the vehicle engine is running, normal practice is to drive the vehicle away from the spill unless driving away would pose an unacceptable risk to the driver.

d. If an aircraft in the spill area has its engine running at the time of the spill, normally it should lift off out of the spill area. The heat of the engines can cause the spill to ignite. The rotor or prop wash from an aircraft can spread the vapor hazard to an area where ignition sources may be present, thus increasing the danger. It can also cause the problem of dissipating fire fighting agents.

6. Clean up small priming fuel spills.
   a. Post a fireguard by the spill area with a fire extinguisher until the cleanup operation is completed.
   b. Use the fuel spill control kit's bag of granular absorbent to spread over the spill.
   c. Dig up the absorbent and contaminated soil using the two-piece non-sparking shovel and place the absorbent and soil into plastic disposal bags.
   d. Use tie strips to seal the bags. Store and transport the bags in a 55 gal. (208.2 L) drum marked with the "Hazardous Material" caution plate.
7. Clean up small fuel spills.
   a. Post a fireguard by the spill area with a fire extinguisher until the cleanup operation is completed.
   b. Use the fuel spill control kit's 15 in. (37.1 cm) wide x 20 in. (50.8 cm) long absorbent pads to absorb the fuel if necessary.
   c. If low flash point fuel, such as JP-4, has been spilled, dig up the contaminated soil using a non-sparking shovel and place into plastic disposal bags.
   d. Use tie strips to seal the bags. Store and transport the bags in the 55 gal. (208.2 L) drums marked with the "Hazardous Material" caution plate.
8. Clean up large fuel spills.
   a. At a permanent installation or large temporary refueling point where there is a fire department or fire brigade, fire fighters must be standing by and operations stopped in the area.
   b. After the immediate emergency is over, go to the unit's appropriate response plan document prepared per AR 200-1 for instructions on whom to call.
   c. Until cleanup help arrives, it may be best to rope off the area, post a guard, close down nearby refueling operations and allow the spill to evaporate.
   d. The spill area should not be used for operations again until it is free of fuel vapors.

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

STOWAGE, DATA PLATES, AND STENCILS GUIDE

INTRODUCTION

1. This work package provides the stowage location of the COEI and BII.
2. The KEY in Tables 1-2 refers to Figure 1 on the next page.
3. This work package also shows the location of the data plates and stencils.

Table 1. COEI Stowage Location.

KEY	NOMENCLATURE	QTY	STOWAGE LOCATION
1	HOSE, DISCHARGE: 2 in. x 13 ft	2	In trough assembly at left side of TRM
2	HOSE, DISCHARGE: 4 in. x 15 ft	2	In trough assembly at left side of TRM
3	HOSE, DISCHARGE: 4 in. x 8 ft, 3 in.	1	In trough assembly at left side of TRM
4	HOSE, DISCHARGE: 4 in. x 6 ft, 2 in.	1	In trough assembly at left side of TRM
5	FIRE EXTINGUISHER	2	One at left-front of TRM; one at right-rear of TRM; each mounted on bracket
6	CAMLOCK ADAPTER	1	At right-rear of TRM, mounted on bracket
7	TEE ASSEMBLY	1	At left-rear of TRM, mounted on bracket
8	KIT, FUEL SPILL CONTROL	1	At left-front of TRM
9	NOZZLE ASSEMBLY (Open Port)	1	In tool box at right-front of TRM
10	HOSE, DISCHARGE: 3 in. x 3.5 ft	1	In tool box at right-front of TRM
11	FLANGE ADAPTER ASSEMBLY (D1)	1	In tool box at right-front of TRM
12	REDUCER, QUICK DISCONNECT: 4 to 3 in.	1	In tool box at right-front of TRM

Table 2. BII Stowage Location.

KEY	NOMENCLATURE	QTY	STOWAGE LOCATION
13	TECHNICAL MANUAL: TM 10-4930-365-13&P	1	In tool box at right-front of TRM
14	BAG, TOOL	1	In tool box at right-front of TRM
	HAMMER, HAND: soft plastic head	1	In tool bag
	KNIFE, PUTTY: 1-1/4 in. blade	1	In tool bag
	PLIERS, SLIP JOINT: 8 in.	1	In tool bag
	SCREWDRIVER, CROSS TIP: #2	1	In tool bag
	SCREWDRIVER, FLAT TIP: 1/4 in.	1	In tool bag
	WRENCH, ADJUSTABLE: 12 in.	1	In tool bag
	WRENCH, BOX AND OPEN END: 9/16 in.	1	In tool bag
	WRENCH, BOX AND OPEN END: 1/2 in.	1	In tool bag
15	GAUGE STICK	1	In stowage tube assembly on top of TRM

INTRODUCTION – CONTINUED

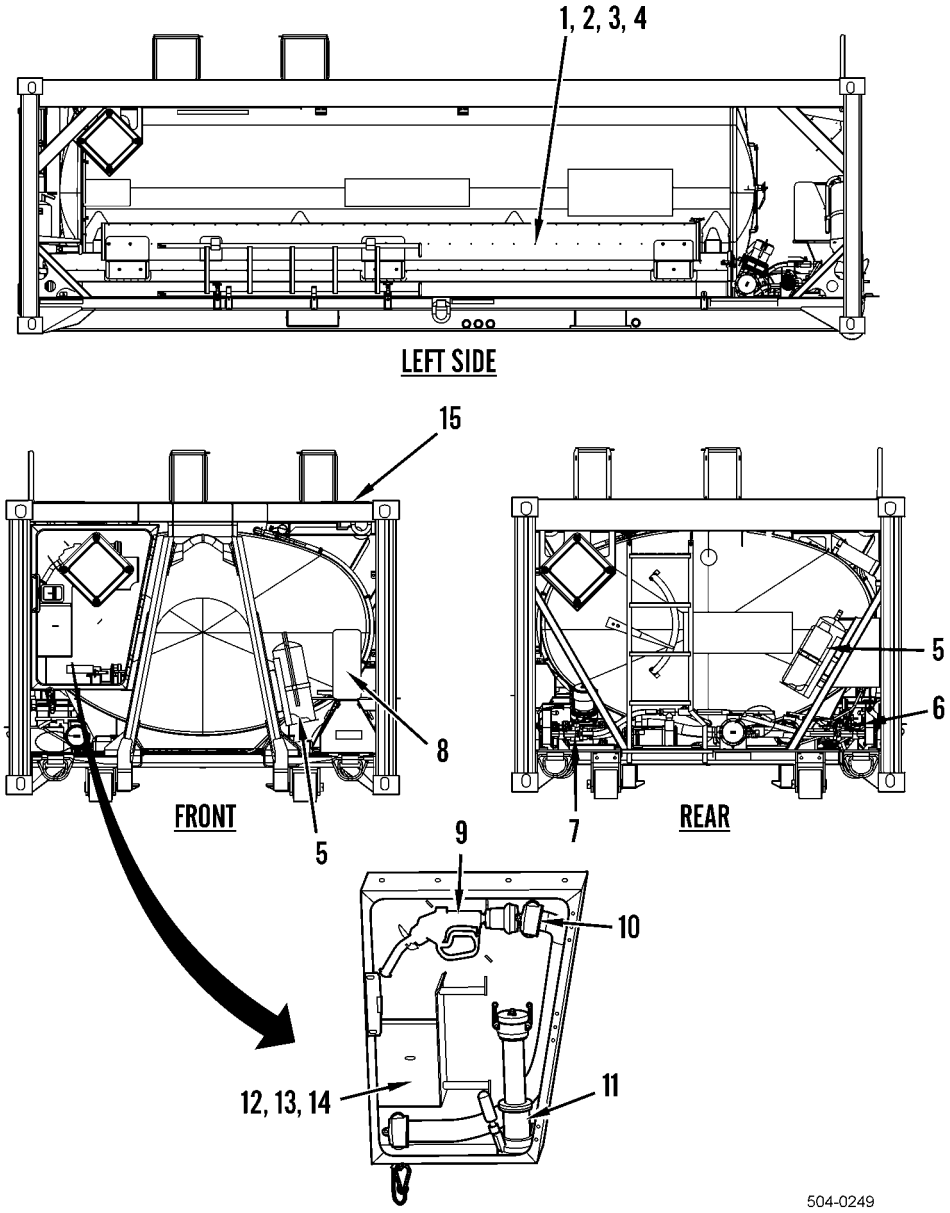


Figure 1. COEI and BII Stowage Location.

DATA PLATES

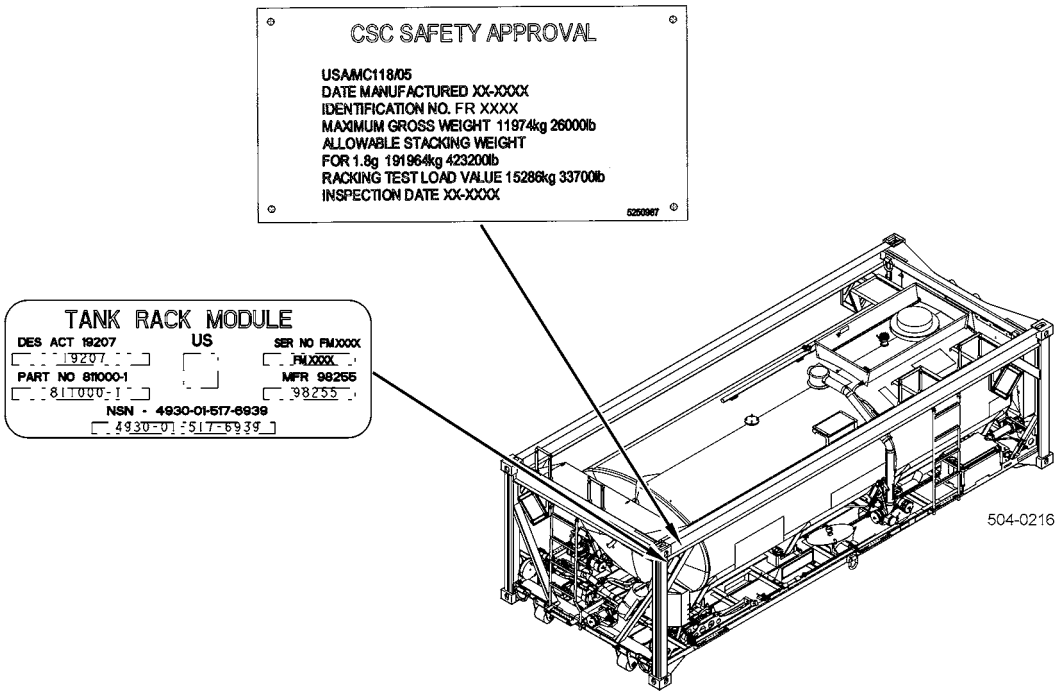


Figure 2. Data Plates, Right Rear.

DATA PLATES – CONTINUED

CTMV MFR E.D. ETNYRE 1333 S. DAYSVILLE RD. OREGON IL. 61061	CTMV CERT DATE XX-XX	MAX LOADING DENSITY 8.00 LBS/GAL	MAX UNLOAD RATE 400 GPM	MIN HEAD THICK .100"
CT DATE OF MFR XX-XX	DOT SPEC DOT 406	NOMINAL CAPACITY 2500 GALLONS	MAX UNLOAD PRESS 0 PSIG	SHELL MATERIAL A240-304
TANK SERIAL NO. FM XXXX	TANK MAWP 3.3 @ 120% F	MAX LOAD RATE 400 GPM	WELD MAT'L ER 308 & ER 309	HEAD MATERIAL A240-304
ORIG. TEST DATE XX-XX	TEST PRESSURE 5.0 PSIG	DESIGN TEMP RANGE -50% F TO 120% F	MIN SHELL THICK UPPER .100"	EXPOSED SURFACE AREA 316 SQ FT
	MAX PAYLOAD 18000 LBS	MAX LOAD PRESS 5 PSIG	MIN SHELL THICK LOWER .129"	

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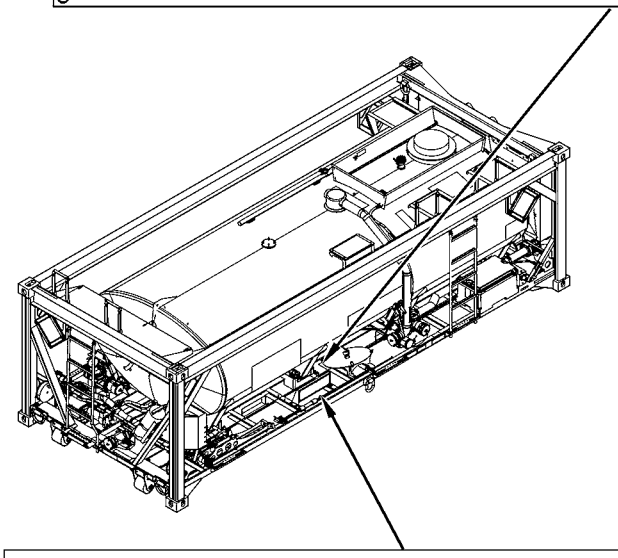
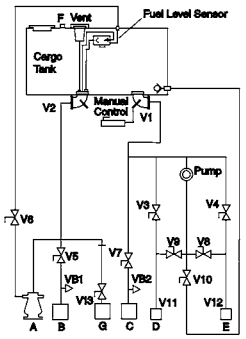


Valves	1	2	3	4	5	6	7	8	9	10	11	12	13	
Bottom Discharge Port A	X	O	X	X	X	X	X	X	X	X	X	X	X	
Gravity Discharge Port C	O	X	X	X	X	X	O	X	X	X	X	X	X	
Gravity Discharge Port D	O	X	O	X	X	X	X	X	X	X	O	X	X	
Gravity Discharge Port E	O	X	X	O	X	X	X	X	X	X	X	O	X	
Pump Discharge Port D	O	X	X	X	X	X	X	X	O	X	O	X	X	
Pump Discharge Port E	O	X	X	X	X	X	X	O	X	X	X	O	X	
Hose Evacuation Port D	X	X	O	X	X	X	X	X	X	O	O	X	X	
Hose Evacuation Port E	X	X	X	O	X	X	X	X	X	O	X	O	X	
Hose Evacuation Port C	X	X	X	X	X	X	O	X	X	O	X	X	X	
Bottom Loading Port A	X	X	X	X	X	X	X	X	X	X	X	X	X	Connect Vapor Recovery Line
Bottom Loading Port B	X	X	X	X	O	X	X	X	X	X	X	X	X	Connect Vapor Recovery Line
Top Loading Port F	X	X	X	X	X	X	X	X	X	X	X	X	X	
Precheck Bottom Loading System Port A	X	X	X	X	X	O	X	X	X	X	X	X	X	Connect Vapor Recovery Line
Precheck Bottom Loading System Port B	X	X	X	X	O	O	X	X	X	X	X	X	X	Connect Vapor Recovery Line
Front Discharge	X	O	X	X	X	X	X	X	X	X	X	X	O	
Front Load	X	X	X	X	X	X	X	X	X	X	X	X	O	
Bottom Discharge Port B	X	O	X	X	O	X	X	X	X	X	X	X	X	

X = Closed
O = Open



Plumbing Schematic 2500 Gal Tank

Port	
A	Bottom Loading Single Port
B	Bottom Loading 4"
C	Discharge 4"
D	Discharge 2"
E	Discharge 2"
F	Top Loading
G	Bottom Front Port

Valve	
1	Discharge
2	Bottom Loading
3	Discharge Port D Gravity
4	Discharge Port E Gravity
5	Bottom Loading Port B Control
6	Pre Check
7	Discharge Port C Control
8	Discharge Port E Pumped
9	Discharge Port D Pumped
10	Evac. Return
11	2" Unisex
12	2" Unisex
13	Front Load/Discharge

Vacuum Breakers	
VB1	Port B
VB2	Port C

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Figure 3. Data Plates, Right Side.

DATA PLATES – CONTINUED

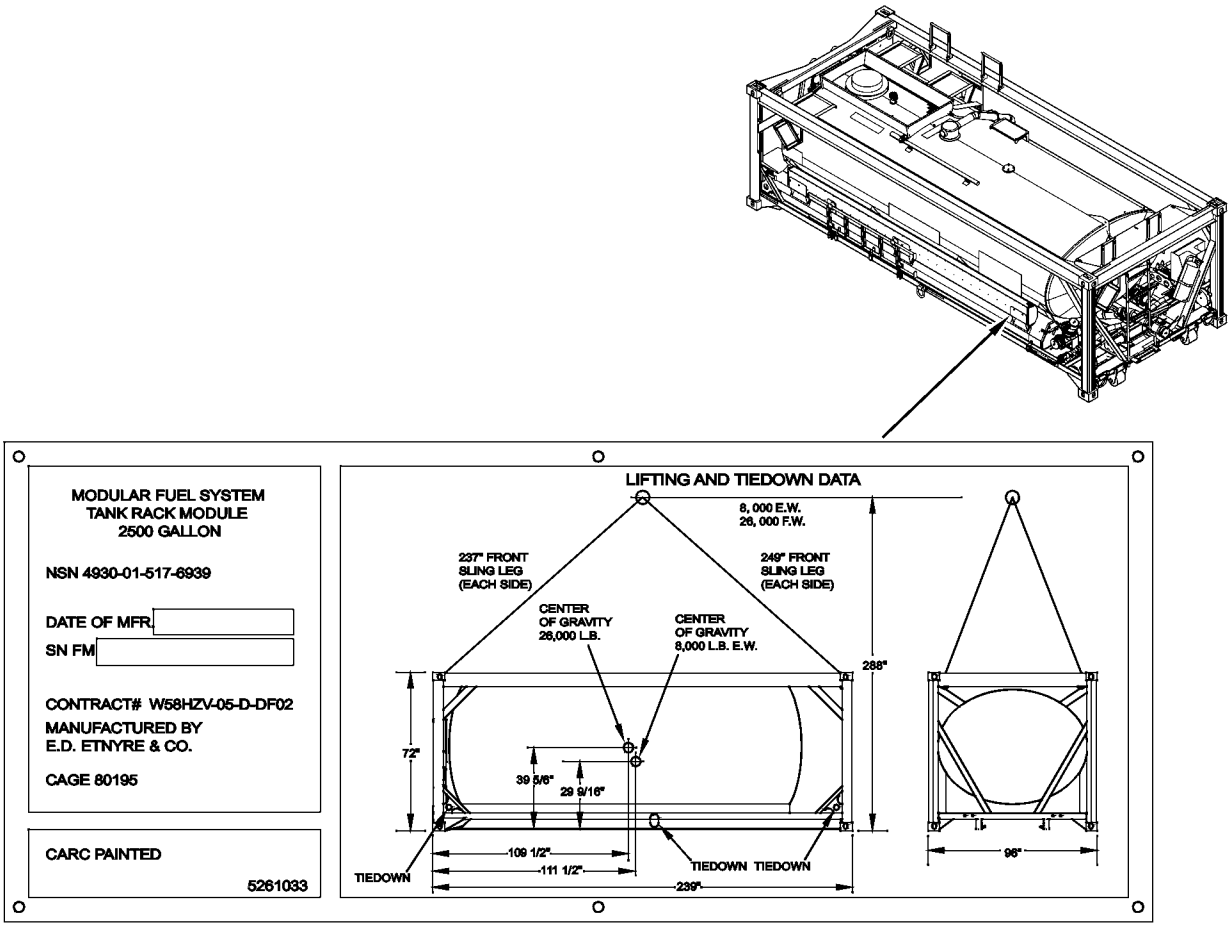

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Figure 4. Data Plates, Left Side

STENCILS

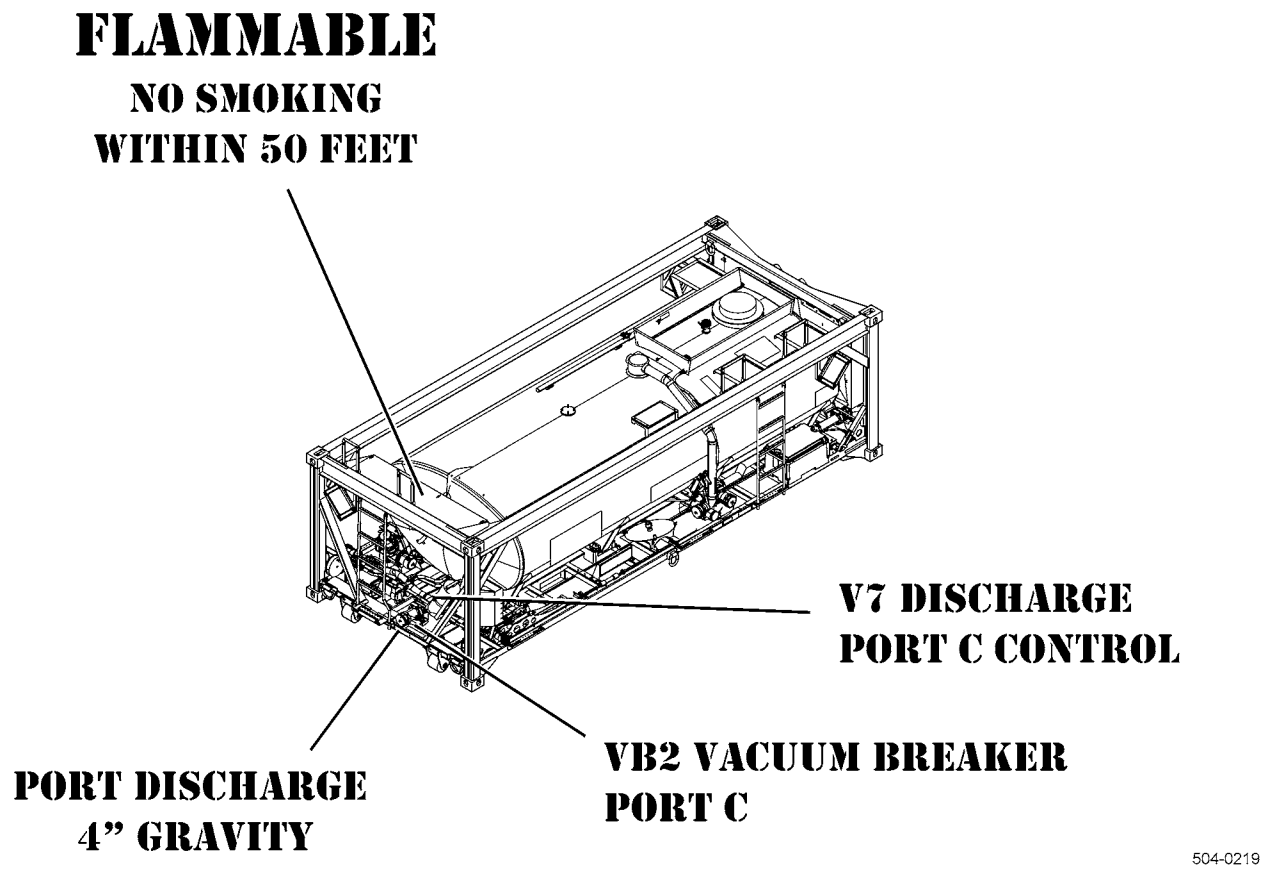


Figure 5. Stencils, Rear.

STENCILS – CONTINUED

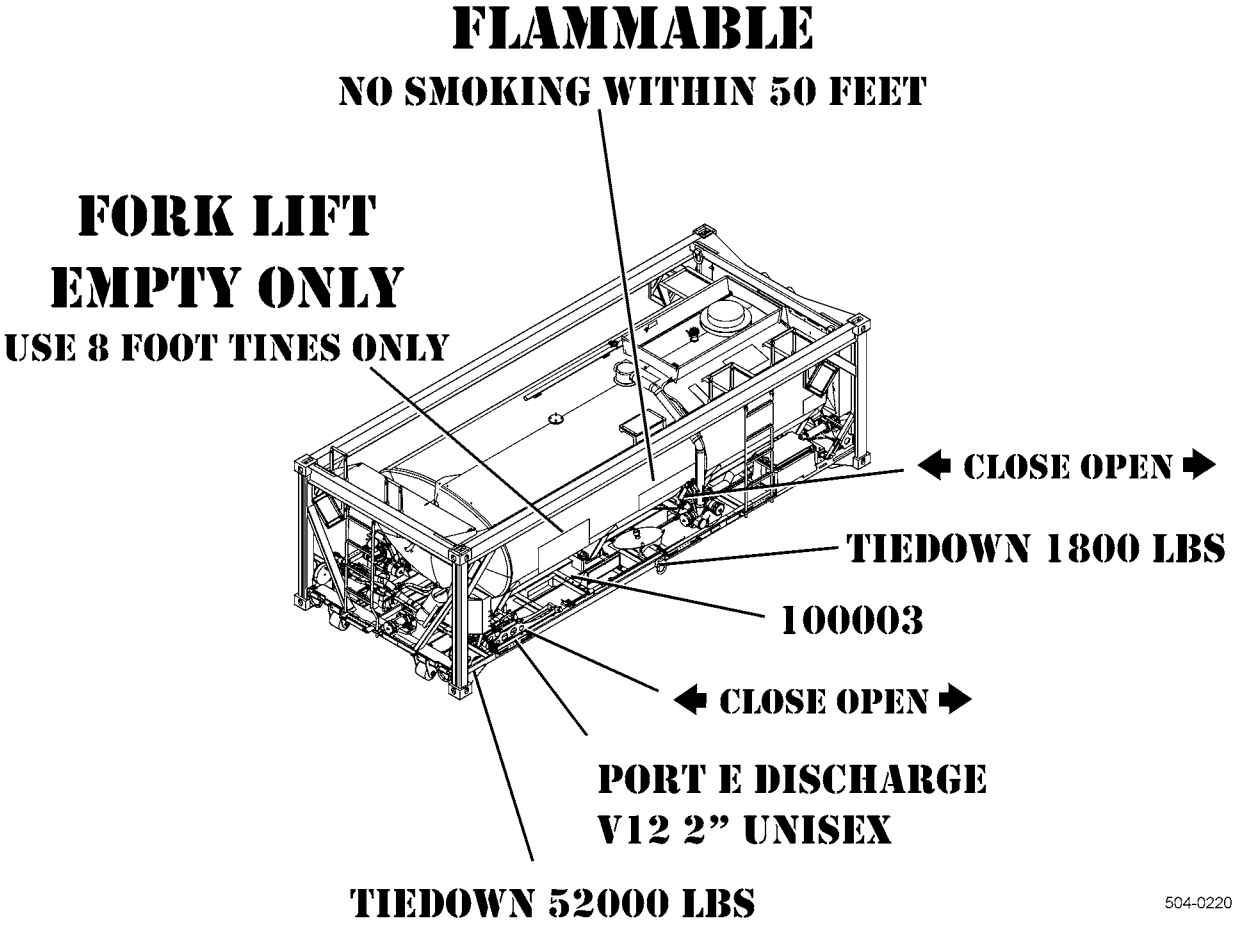


Figure 6. Stencils, Right Side.

STENCILS – CONTINUED

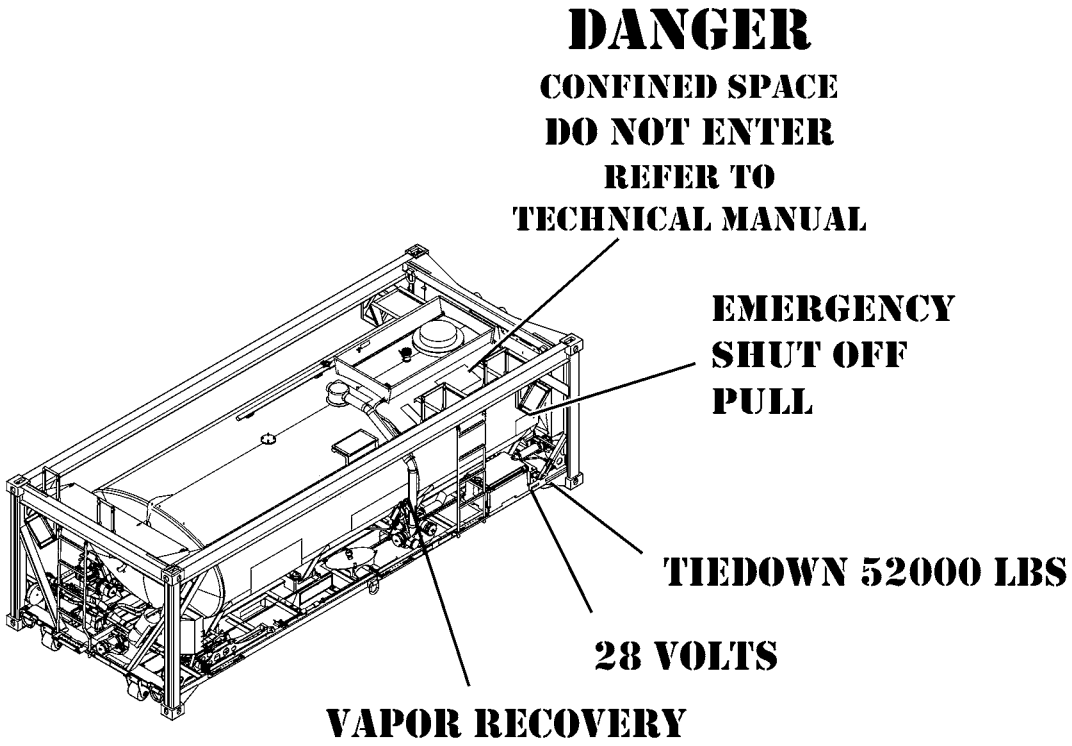


Figure 7. Stencils, Right Front.

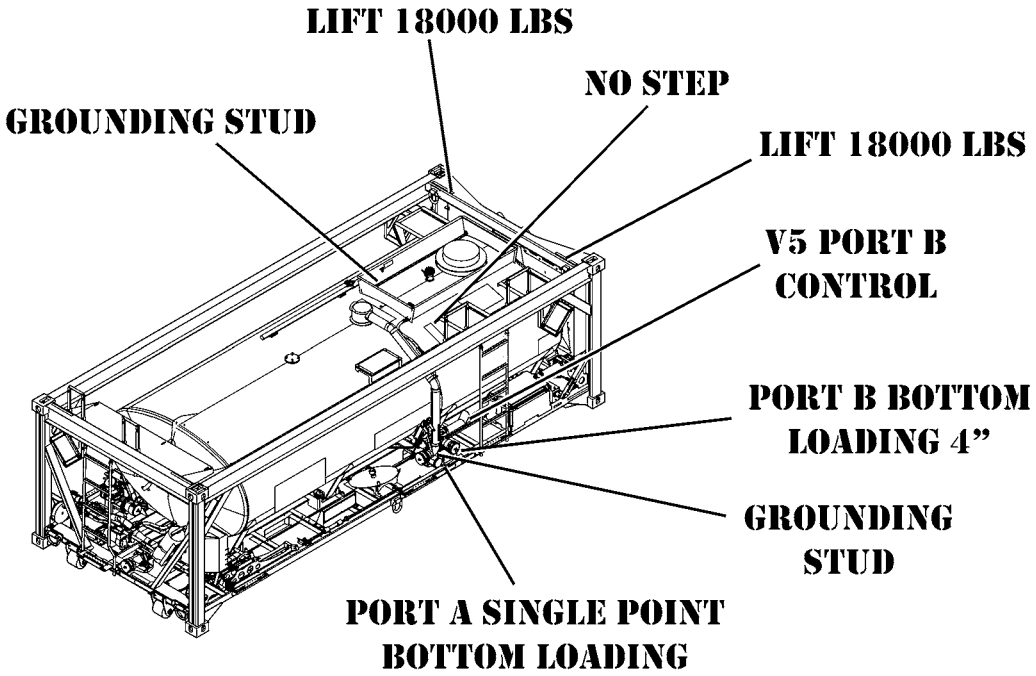


Figure 8. Stencils, Top and Right Side.

STENCILS – CONTINUED

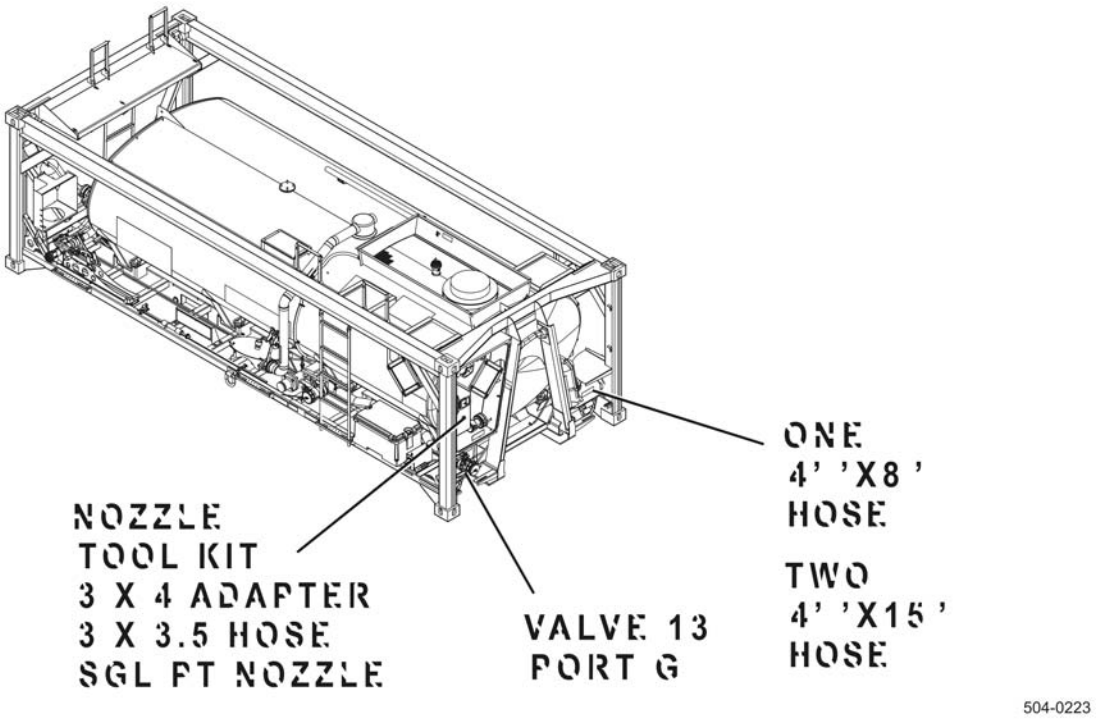


Figure 9. Stencils, Front.

STENCILS – CONTINUED

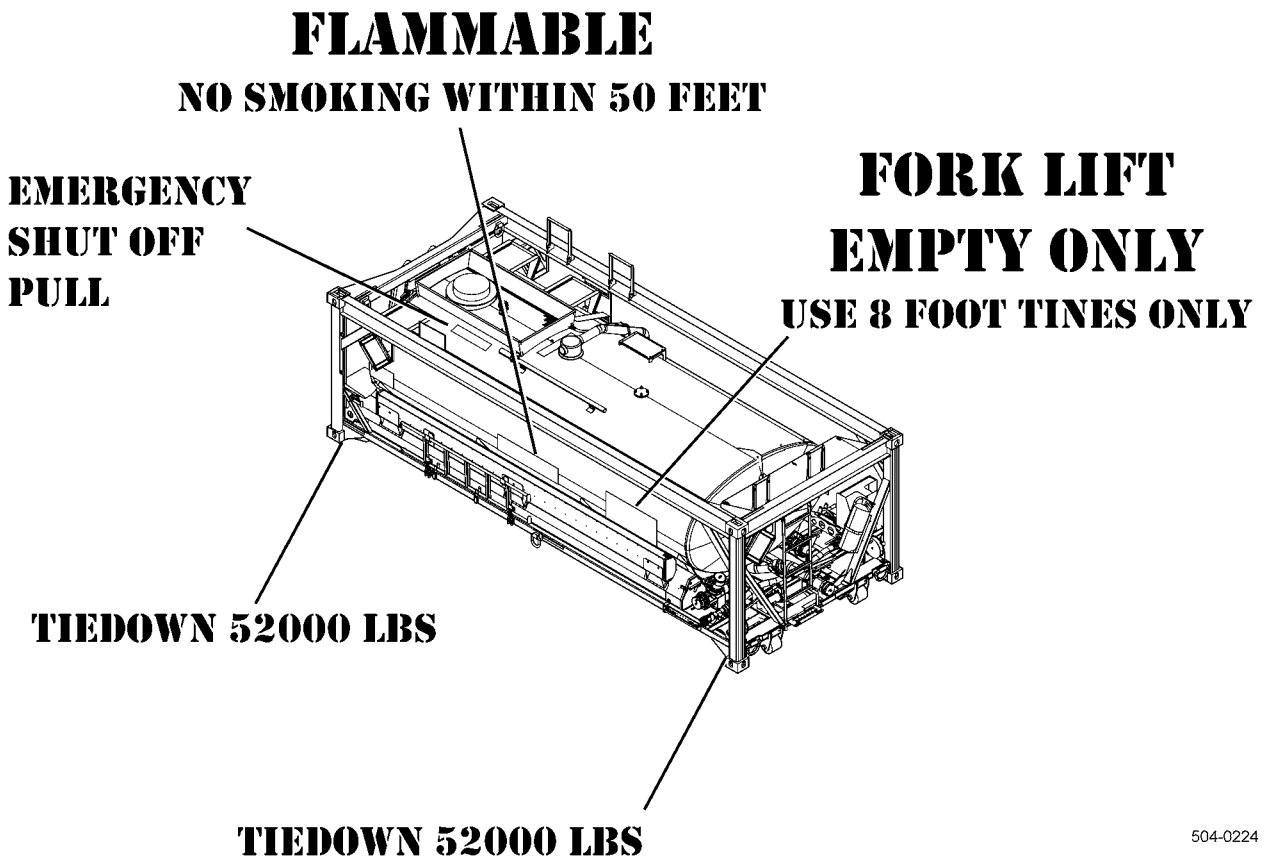


Figure 10. Stencils, Left Side.

STENCILS – CONTINUED

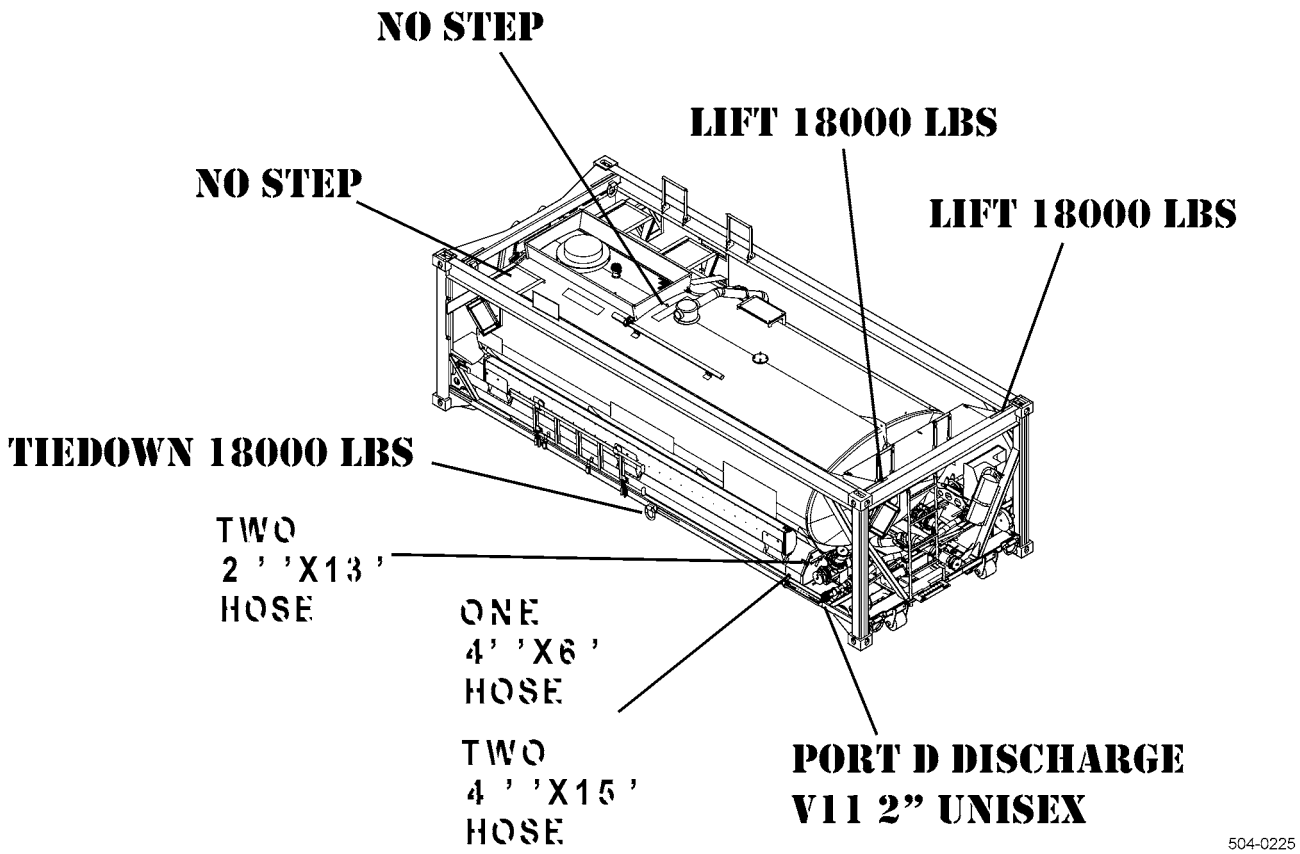


Figure 11. Stencils, Top, Rear, and Left Side.

END OF WORK PACKAGE

CHAPTER 3

OPERATOR TROUBLESHOOTING PROCEDURES

OPERATOR MAINTENANCE

OPERATOR TROUBLESHOOTING INDEX

MALFUNCTION/SYMPTOM		TROUBLESHOOTING PROCEDURE PAGE
1.	Static Spark Occurrence At Fuel Dispensing Nozzle	WP 0029-2
2.	Fuel Does Not Flow Into Tank	WP 0029-2
3.	Coupling Assembly Leaks Fuel	WP 0029-2
4.	Fuel Leaks During Transport	WP 0029-3
5.	V1 Valve Leaks At Gasket	WP 0029-3
6.	Fuel Leaks From Precheck Ball (V6) Valve	WP 0029-3
7.	Camlock Adapter Leaks Fuel	WP 0029-3
8.	Camlock Adapter Will Not Connect With Other Components	WP 0029-3
9.	Fuel Leaks From Bottom Load Valve Piping Assembly	WP 0029-3
10.	Fuel Leaks From Inlet/Outlet Piping Butterfly Valve	WP 0029-4
11.	Fuel Leaks From Quick Disconnect Coupling Half	WP 0029-4
12.	V2 Valve Leaks At Gasket	WP 0029-4
13.	V2 Valve Will Not Open or Close	WP 0029-4
14.	V2 Valve Does Not Open Automatically	WP 0029-4
13.	V2 Valve Will Not Open or Close	WP 0029-4
15.	Discharge Piping Assembly Leaks At Discharge Fuel Hose	WP 0029-4
16.	Discharge Piping Assembly Leaks At Couplings	WP 0029-5
17.	Discharge Piping Assembly Butterfly (V7) Valve Leaks At Discharge Piping Assembly Connection	WP 0029-5
18.	2 in. (5.08 cm) Discharge Fuel Hose Leaks	WP 0029-5
19.	Discharge Arm Assembly Leaks At Discharge Fuel Hose	WP 0029-5
20.	Left or Right Hand Discharge Arm Leaks	WP 0029-6
21.	Discharge/Suction Hose Leaks Fuel	WP 0029-6
22.	Discharge/Suction Hose is Damaged or Will Not Connect With Other Components	WP 0029-6
23.	Tee Assembly Leaks Fuel	WP 0029-6
24.	Tee Assembly Will Not Connect With Other Components	WP 0029-6
25.	Fuel Pump Assembly Does Not Run	WP 0029-7
26.	Fuel Pump Assembly Runs, But No Flow	WP 0029-7
27.	Fuel Pump Assembly Low Flow Rate	WP 0029-7
28.	Fuel Pump Assembly Stalls When Nozzle Is Closed	WP 0029-7
29.	Fuel Pump Assembly Overheats	WP 0029-8

END OF WORK PACKAGE

OPERATOR MAINTENANCE

OPERATOR TROUBLESHOOTING PROCEDURES

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

Personnel Required

Petroleum Supply Specialist 92F (2)

References

FM 10-67-1

References - Continued

WP 0023
WP 0034

Equipment Condition

TRM prepared for use (WP 0005)

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

SYMPTOM
MALFUNCTION
CORRECTIVE ACTION

1. STATIC SPARK OCCURRENCE AT FUEL DISPENSING NOZZLE.

Nozzle not grounded properly.

a. Immediately stop TRM operation and inspect nozzle connection for correct bonding and ground rod for proper connection (FM 10-67-1).
b. Correct bonding/ground and continue with TRM operation.
c. If condition still exists, contact Field Maintenance.

2. FUEL DOES NOT FLOW INTO TANK.

V6 valve open.

Close V6 valve.

Valve closed from fuel source.

Open valve at fuel source.

Valve closed on TRM.

Open valve on TRM.

Tank is over full.

Stop fueling operations.

Inlet piping assembly butterfly valve (V5 or V13) defective.

Contact Field Maintenance.

V2 valve defective.

Contact Field Maintenance.

3. COUPLING ASSEMBLY LEAKS FUEL.

Coupling assembly leaks fuel at interface.

a. Remove components with quick disconnect coupling halves (WP 0034).
b. Inspect quick disconnect coupling halves for dust or debris inside couplings. Remove any dust or debris found (WP 0034).
c. Inspect quick disconnect coupling halves for defective or missing seal. If seal is defective or missing, replace disconnect coupling half seal (WP 0034).
d. Install components with quick disconnect coupling halves (WP 0034).
e. If condition still exists, contact Field Maintenance.

Coupling assembly damaged or defective.

Contact Field Maintenance.

SYMPTOM
MALFUNCTION
CORRECTIVE ACTION

4. FUEL LEAKS DURING TRANSPORT.

Defective seals, gaskets, or piping.

Contact Field Maintenance.

Defective vent gasket.

Contact Field Maintenance.

5. V1 VALVE LEAKS AT GASKET.

Defective gasket.

Contact Field Maintenance.

Defective V1 valve.

Contact Field Maintenance.

6. FUEL LEAKS FROM PRECHECK BALL (V6) VALVE.

Defective valve.

Contact Field Maintenance.

7. CAMLOCK ADAPTER LEAKS FUEL.

Camlock adapter connectors are improperly fastened.

a. Inspect camlock adapter coupling for dirt or debris trapped inside the camlock adapter connection, and remove any dirt or debris found.
b. Inspect camlock adapter connector for defective or missing gasket. If gasket is defective or missing, replace camlock adapter connector gasket (WP 0034).
c. If condition still exists, contact Field Maintenance.

8. CAMLOCK ADAPTER WILL NOT CONNECT WITH OTHER COMPONENTS.

Camlock adapter is damaged or defective.

Contact Field Maintenance.

9. FUEL LEAKS FROM BOTTOM LOAD VALVE PIPING ASSEMBLY.

Damaged coupling seal.

Contact Field Maintenance.

Damaged quick disconnect coupling half.

Contact Field Maintenance.

Damaged inlet piping assembly butterfly valve.

Contact Field Maintenance.

SYMPTOM
MALFUNCTION
CORRECTIVE ACTION

10. FUEL LEAKS FROM INLET/OUTLET PIPING BUTTERFLY VALVE.

Damaged gaskets.

Contact Field Maintenance.

Defective butterfly valve.

Contact Field Maintenance.

11. FUEL LEAKS FROM QUICK DISCONNECT COUPLING HALF.

Damaged gasket.

Contact Field Maintenance.

Defective adapter assembly.

Contact Field Maintenance.

12. V2 VALVE LEAKS AT GASKET.

Defective gasket.

Contact Field Maintenance.

13. V2 VALVE WILL NOT OPEN OR CLOSE.

Defective valve.

Contact Field Maintenance.

14. V2 VALVE DOES NOT OPEN AUTOMATICALLY.

Tank full.

a. Stop filling operations.
b. If tank is not full, proceed to next malfunction.

V6 valve open.

a. Close V6 valve.
b. If V6 valve is closed, proceed to next malfunction.

V2 valve or liquid level switch is malfunctioning.

Contact Field Maintenance.

15. DISCHARGE PIPING ASSEMBLY LEAKS AT DISCHARGE FUEL HOSE.

Discharge fuel hose is loose or improperly installed.

Tighten fittings on discharge fuel hose.

Discharge fuel hose is damaged or defective.

Contact Field Maintenance.

SYMPTOM
MALFUNCTION
CORRECTIVE ACTION

16. DISCHARGE PIPING ASSEMBLY LEAKS AT COUPLINGS.

Couplings are loose or improperly installed.

Contact Field Maintenance.

Couplings are defective or damaged.

Contact Field Maintenance.

Discharge piping assembly is defective or damaged.

Contact Field Maintenance.

17. DISCHARGE PIPING ASSEMBLY BUTTERFLY (V7) VALVE LEAKS AT DISCHARGE PIPING ASSEMBLY CONNECTION.

Gasket between discharge piping assembly and butterfly valve is defective or damaged.

Contact Field Maintenance.

18. 2 IN. (5.08 CM) DISCHARGE FUEL HOSE LEAKS.

2 in. (5.08 cm) discharge fuel hose is loose or improperly installed.

a. Remove and install quick disconnect coupling half (WP 0034).
b. Check for debris inside couplings and remove any debris found.
c. If quick disconnect coupling half still leaks at coupling, proceed to next malfunction.

Quick disconnect half seal leaks.

a. Remove and install quick disconnect coupling half seals (WP 0034).
b. If quick disconnect coupling still leaks at coupling, proceed to next malfunction.

2 in. (5.08 cm) discharge fuel hose is defective or damaged.

Contact Field Maintenance.

19. DISCHARGE ARM ASSEMBLY LEAKS AT DISCHARGE FUEL HOSE.

1 in. (2.54 cm) discharge fuel hose is loose or improperly installed.

a. Tighten connections.
b. If condition still exists, contact Field Maintenance.

1 in. (2.54 cm) discharge fuel hose is damaged or defective.

Contact Field Maintenance.

2 in. (5.08 cm) discharge fuel hose is loose or improperly installed.

a. Tighten connections.
b. If condition still exists, contact Field Maintenance.

2 in. (5.08 cm) discharge fuel hose damaged or defective.

Contact Field Maintenance.

SYMPTOM
MALFUNCTION
CORRECTIVE ACTION

20. LEFT OR RIGHT HAND DISCHARGE ARM LEAKS.

Couplings are loose or improperly installed.

a. Tighten connections.
b. If condition still exists, contact Field Maintenance.

Couplings are defective or damaged.

Contact Field Maintenance.

Discharge arm joints or connections damaged or defective.

Contact Field Maintenance.

21. DISCHARGE/SUCTION HOSE LEAKS FUEL.

Camlock connection leaks.

a. Remove components with camlock connections (WP 0034).
b. Inspect camlock coupling for dirt or debris trapped inside the camlock connections and remove any dirt or debris found.
c. Inspect camlock connector for defective or missing gasket. If gasket is defective or missing, replace camlock connector gasket (WP 0034).
d. Install components with camlock connectors (WP 0034).
e. If condition still exists, contact Field Maintenance.

22. DISCHARGE/SUCTION HOSE IS DAMAGED OR WILL NOT CONNECT WITH OTHER COMPONENTS.

Suction hose damaged or defective.

Contact Field Maintenance.

23. TEE ASSEMBLY LEAKS FUEL.

Camlock connection leaks.

a. Remove components with camlock connectors (WP 0034).
b. Inspect camlock coupling for dirt or debris trapped inside the camlock connection, and remove any dirt or debris found.
c. Inspect camlock connector for defective or missing gasket. If gasket is defective or missing, replace it (WP 0034).
d. Install components with camlock connectors (WP 0034).
e. If condition still exists, contact Field Maintenance.

24. TEE ASSEMBLY WILL NOT CONNECT WITH OTHER COMPONENTS.

Tee assembly damaged or defective.

Contact Field Maintenance.

SYMPTOM
MALFUNCTION
CORRECTIVE ACTION

25. FUEL PUMP ASSEMBLY DOES NOT RUN.

Dead batteries.

a. Connect slave cables (WP 0023).
b. If condition still exists, contact Field Maintenance.

Wiring problem.

Contact Field Maintenance.

ON and OFF switch defective.

Contact Field Maintenance.

26. FUEL PUMP ASSEMBLY RUNS, BUT NO FLOW.

Strainer blocked.

Contact Field Maintenance.

Tank level low.

Add fuel to tank.

Wrong valves opened or closed.

a. Ensure the correct valves are opened and closed.
b. If condition still exists, contact Field Maintenance.

27. FUEL PUMP ASSEMBLY LOW FLOW RATE.

Strainer blocked.

Contact Field Maintenance.

Low voltage.

a. Connect slave cables (WP 0023).
b. If condition still exists, contact Field Maintenance.

28. FUEL PUMP ASSEMBLY STALLS WHEN NOZZLE IS CLOSED.

Low voltage.

a. Connect slave cables (WP 0023).
b. If condition still exists, contact Field Maintenance.

Fuel pump assembly defective.

Contact Field Maintenance.

SYMPTOM MALFUNCTION CORRECTIVE ACTION

29. FUEL PUMP ASSEMBLY OVERHEATS.

Fuel pump operated longer than 30 minutes.

Allow to cool.

Strainer blocked.

Contact Field Maintenance

Clogged or restricted hose.

Contact Field Maintenance.

Fuel pump defective.

Contact Field Maintenance.

END OF WORK PACKAGE

CHAPTER 4

OPERATOR MAINTENANCE INSTRUCTIONS

OPERATOR MAINTENANCE

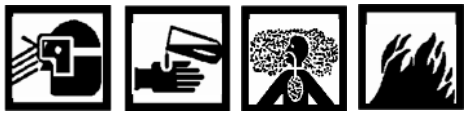
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION
General, Leakage Definitions, Inspection

GENERAL

1. Preventive Maintenance Checks and Services (PMCS) are performed to keep the TRM in operating condition. The checks are used to find, correct or report problems. Operators should perform the PMCS as shown in the PMCS table. Using the PMCS table, preventive maintenance checks and services are performed every day the equipment is operated. Pay attention to WARNING and CAUTION statements. A WARNING indicates that someone could be injured or killed. A CAUTION indicates the possibility of equipment damage.
2. Prior to operating the equipment, ***BEFORE*** PMCS should be conducted.
3. Perform ***DURING*** PMCS during equipment operation.
4. ***AFTER*** PMCS should be performed upon completion of equipment operation.
5. Use troubleshooting and/or maintenance procedures to correct problems found when performing PMCS.
6. The right-hand column of the PMCS table lists conditions that classify the equipment as *not fully mission capable*. Report items as *not-fixed* on DA Form 2404 or DA Form 5988-E for Field Maintenance. For further information on how to use this form, see DA PAM 750-8.
7. If tools are required to perform PMCS and are not listed in WP 0151, notify Field Maintenance.

LEAKAGE DEFINITIONS

WARNING



Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

CAUTION

Equipment operation is allowed with minor Class I or II leakage. Class III leaks must be reported immediately to Field Maintenance. Failure to comply may cause damage to equipment.

1. When operating with Class I or II leaks, continue to check for leakage as required in your PMCS.
2. If there is a Class III leak, shut down operation immediately, and report it to Field Maintenance.
3. It is important to understand how fluid leakage affects the status of the TRM. Following are definitions of the leakage classes the operator needs to become familiar with in order to be able to determine the condition of the leak. Remember, when in doubt, always consult your supervisor.
4. Leakage Classifications for Operator PMCS:
5. CLASS I - Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
6. CLASS II - Leakage of fluid great enough to form drops but not enough to cause drops to drip from Item being inspected.
7. CLASS III - Leakage of fluid great enough to form drops that fall from the item being inspected.

INSPECTION

1. Look for signs of a problem or trouble. You can feel, smell, hear, or see many problems. Be alert when using the equipment.
2. Inspect to ensure Items are in good condition. Are they correctly assembled, stowed, secured, properly lubricated, or excessively worn, leaking, or corroded? Correct any problems found or notify Field Maintenance.
3. The following are common Items to check throughout the equipment:
    a. Bolts, clamps, nuts and screws: Continually check for looseness. Look for chipped paint, bare metal, rust, or corrosion around bolt and screw heads and nuts, and tighten when loose. If tools are not available, contact Field Maintenance.
    b. Welds: Many Items on the equipment are welded. To check defective welds, look for chipped paint, rust, corrosion or gaps. When these conditions exist, notify Field Maintenance on DA Form 2404 or DA Form 5988-E.
    c. Electrical wires, connectors and harnesses: Tighten loose connectors. Look for cracked or broken insulation, bare wires, and broken connectors. If any of these conditions exist, notify Field Maintenance.
    d. Hoses and fluid lines: Look for wear, damage and leaks. Ensure that clamps and fittings are tight. Wet spots indicate leakage. A stain near a fitting or connector can also indicate leakage. If a leakage is discovered, notify Field Maintenance.

END OF WORK PACKAGE

OPERATOR MAINTENANCE

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

INITIAL SETUP

Materials/Parts

Apron, utility (WP 0153, Item 1)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

References

WP 0002
WP 0004
WP 0033

Personnel Required

Petroleum Supply Specialist 92F (2)

Table 1. Preventive Maintenance Checks and Services.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
				WARNING • Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. • Wet metal surfaces are slippery. Use caution when climbing on tank. Failure to comply could result in injury or death to personnel. • Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge. • Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face. • Failure to comply could result in injury or death to personnel. **NOTE** Refer to WP 0002 and WP 0004 for location of components.	
1	Before		TRM Frame	a. Check TRM frame for damage and broken or cracked welds.	TRM frame has broken or cracked welds.
				b. Check installed ladders for loose or missing hardware.	Ladders have missing hardware.
				c. Check handles for loose or missing hardware.	Handles have missing hardware.
				d. Check roller assemblies for damage and loose or missing hardware.	If required for mission rollers are damaged or missing hardware.
				e. Check placards for damage, loose or missing hardware.	
				f. Check stenciling and data plate around frame for legibility.	
				g. Check hose trough assembly for dents, loose or missing hardware.	

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
2	Before		Tank Assembly	a. Check tank shell for dents, leakage, and broken welds.	Class III fuel leak is found.
				b. Check tank mounting hardware, isolation mounts and helical compression springs for loose or missing hardware.	Loose or missing hardware.
				c. Check area around and under tank for leakage.	Class III fuel leak is found.
				d. Check V1 valve for leakage.	Class III fuel leak is found.
				e. Check V2 valve for leakage.	Class III fuel leak is found.
				f. Check stenciling and data plates around tank for legibility.	
	RIGHT SIDE				
3	Before		Bottom Load Valve Piping Assembly (Port G)	a. Check piping assembly for any damage that may cause leakage	Class III fuel leak is found.
				b. Check V13 valve for leakage.	Class III fuel leak is found.
				c. Check piping assembly and V13 valve for loose or missing hardware.	Piping assembly or V13 valve has missing hardware.
				d. Check dust cap and seal for damage.	Seal is damaged or missing.
4	Before		Right Hand Emergency Shutoff Lever	Check emergency shutoff lever operation. • Open V1 and V2 valves. • Pull right hand emergency shutoff lever and observe V1 and V2 valves. • Open V1 valve to reset emergency shutoff. • Close V1 valve.	Emergency shutoff lever does not shut V1 and V2 valves.
5	Before		NATO Slave Connector Box	a. Check connector box for loose or missing hardware.	NATO slave connector box is missing hardware (if required for mission).
				b. Check connector for damage or missing hardware.	Damaged or missing hardware.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
6	Before		Batteries	a. Remove battery box lid (WP 0033)	
				b. Check battery mounting for damage and loose or missing hardware.	Battery mounts are missing hardware.
				c. Check battery cables for loose, damaged or corroded connectors.	Battery cables are damaged.
				d. Install battery box lid (WP 0033).	
7	Before		Bottom Load Valve Piping Assembly (Port B)	a. Check piping assembly for any damage that may cause leakage.	Class III fuel leak is found.
				b. Check V5 valve for leakage or damage.	Class III fuel leak is found.
				c. Check piping assembly and V5 valve for loose or missing hardware.	Piping assembly or V5 valve has missing hardware.
				d. Check dust cap and seal for damage.	Seal is damaged or missing.
				e. Check VB1 valve for leakage or damage.	Class III fuel leak is found.
8	Before		Coupling Half, Quick Disconnect (Port A)	a. Check piping assembly for any damage that may cause leakage.	Class III fuel leak is found.
				b. Check coupling half, quick disconnect for leakage or damage that may cause leakage.	Class III fuel leak is found.
				c. Check piping assembly and coupling half for loose or missing hardware.	Piping assembly or coupling half has missing hardware.
				d. Check dust cap and seal for damage.	Seal is damaged or missing.
				e. Check V6 valve for damage that may cause leakage.	Class III fuel leak is found.
				f. Check precheck tubing for damage that may cause leakage.	Class III fuel leak is found.
9	Before		Vapor Recovery Piping Assembly	a. Check vapor recovery piping assembly for dents, cracks, or damage.	Dented, cracked, or damaged.
				b. Check vapor recovery piping assembly for leakage.	Class III fuel leak is found.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION / ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
9 (Con't)	Before		Vapor Recovery Piping Assembly	c. Check piping assembly for loose or missing hardware.	Loose or missing hardware.
				d. Check dust cap for damage and missing seal.	Seal is damaged or missing.
10	Before		Side Mechanical Operator (V2 valve)	a. Check control lever assembly for damage, loose or missing hardware.	Control lever is damaged or missing hardware.
				b. Check pull cable tubing assembly for damage, bent, broken, or missing hardware.	Pull cable tubing has missing hardware.
				c. Check pull cables for cuts, fraying, or damage.	Cables are cut, frayed, or damaged.
11	Before		Manhole Transporter Cover	Check transporter cover for damage or missing hardware.	Transporter cover is damaged or missing (if required for mission).
12	Before		Ground Rod	Check for damaged or missing ground rod and mounting hardware.	Ground rod is damaged or missing.
13	Before		Drip Pans	Check that drip pans are present.	Drip pans are not present.
14	Before		Control Lever Assembly (V1 valve)	a. Check control lever assembly (V1 valve) for damage, loose or missing hardware.	Control lever is damaged or hardware is missing.
				b. Check pull cable tubing for damage, bent, broken, or missing hardware.	Pull cable tubing damaged or missing hardware.
				c. Check pull cables for cuts, fraying, or damage.	Cables are cut, frayed, or damaged.
	REAR				
15	Before		Right Hand Discharge Arm (Port E)	a. Check discharge arm assembly for damage or leakage.	Class III fuel leak is found.
				b. Check hoses for any missing hardware or damage that may cause leakage.	Class III fuel leak is found.
				c. Check V12, V8 and V4 valves for damage that may cause leakage.	Class III fuel leak is found.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
15 (Con't)	Before		Right Hand Discharge Arm (Port E)	d. Check piping assembly and V12, V8, V4 valves for loose or missing hardware.	Piping assembly or V12, V8 or V4 valves have missing hardware.
				e. Check seals, unisex coupling, and all fittings for damage or leakage.	Class III fuel leak is found.
				f. Check dust cap and seal for damage.	Seal is damaged or missing.
16	Before		Static Ground Reel Assemblies	a. Check reels for damage, loose or missing hardware.	Reel is missing hardware, or is damaged.
				b. Check grounding cable for cuts, fraying or damage.	Grounding cable is cut, frayed or damaged.
17	Before		Camlock Adapter	a. Check camlock adapter for damage that may cause leakage.	Camlock adapter has damage that may cause leakage.
				b. Check butterfly valve for damage that may cause leakage.	Butterfly valve has damage that may cause leakage.
				c. Check tiedown straps for serviceability.	
				d. Check dust caps, seals, and plug for damage.	Seals are damaged or missing.
18	Before		Fire Extinguisher	a. Ensure fire extinguisher is present.	Fire extinguisher is not present.
				b. Check fire extinguisher for serviceability and gauge for indication of full charge.	Fire extinguisher is not fully charged or is damaged.
19	Before		Discharge Piping Assembly (Port C)	a. Check piping assembly for any damage that may cause leakage.	Class III fuel leak is found.
				b. Check V7 valve for leakage or damage.	Class III fuel leak is found.
				c. Check VB2 valve for leakage or damage.	Class III fuel leak is found.
				d. Check piping assembly and V7 valve for loose or missing hardware.	Piping assembly or V7 valve have missing hardware.
				e. Check dust cap and seal for damage.	Seal is damaged or missing.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
20	Before		Fuel Pump Assembly	a. Check fuel pump for any damage that may cause leakage.	Class III fuel leak is found.
				b. Check hoses for missing hardware and damage that may cause leakage.	Class III fuel leak is found.
				c. Check V10 valve for any damage that may cause leakage.	Class III fuel leak is found.
				d. Check piping assembly and V10 valves for loose or missing hardware.	Piping assembly or V10 valves have missing hardware.
				e. Check fuel pump assembly wiring harness and EMI box for damage or missing parts.	Harness or EMI box damaged or missing (if required for mission).
21	Before		Rear Head Tank Gauge	a. Check tank pointer for loose or missing hardware.	
				b. Check tank pointer for damage.	Tank pointer is damaged or does not operate correctly.
22	Before		Left Hand Discharge Arm (Port D)	a. Check discharge arm for damage or leakage.	Class III fuel leak is found.
				b. Check hoses for any damage that may cause leakage.	Class III fuel leak is found.
				c. Check V11, V3, and V9 valves for damage that may cause leakage.	Class III fuel leak is found.
				d. Check piping assembly and V11, V9, V3 valves for loose or missing hardware.	Piping assembly or V11, V9 or V3 valves have missing hardware.
				e. Check dust cap and seal for damage.	Seal is damaged or missing.
23	Before		Tee Assembly	a. Check tee assembly for damage that may cause leakage.	Tee assembly has damage that may cause leakage.
				b. Check butterfly valve for damage that may cause leakage.	Butterfly valve has damage that may cause leakage.
				c. Check tiedown straps for serviceability.	
				d. Check dust caps, seals, and plug for damage.	Seal is damaged or missing.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
	LEFT SIDE				
24	Before		4 in. (10 cm) Suction Hoses	a. Check all hoses for any damage that may cause leakage.	Hose is damaged.
				b. Check coupling halves for damage.	Coupling half is damaged.
				c. Check dust cap, seal, and plugs for damage.	Seal is damaged or missing.
25	Before		2 in. (5 cm) Discharge Hoses	a. Check hoses for any damage that may cause leakage.	Hose is damaged.
				b. Check dry break couplings for damage.	Dry break coupling is damaged.
				c. Check dust cap, seal, and plugs for damage.	Seal is damaged or missing.
26	Before		ISO Ladder	Ensure ISO ladder is present.	ISO ladder is not present, if required for mission.
27	Before			Check ISO ladder for damage.	ISO ladder is damaged, if required for mission.
28	Before			Check for missing or damaged ISO ladder mounting hardware.	
29	Before		Left Hand Emergency Shutoff Lever	Check emergency shutoff lever operation. • Open V1 and V2 valves. • Pull left hand emergency shutoff lever and observe control levers V1 and V2 valves. • Open V1 valve to reset emergency shutoff. • Close V1 valve.	Emergency shutoff lever does not shut V1 and V2.
	FRONT				
30	Before		Spill Containment Kit	Check that spill containment kit is present and secure.	Spill containment kit is missing.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
31	Before		Fire Extinguisher	a. Ensure fire extinguisher is present.	Fire extinguisher is not present.
				b. Check fire extinguisher for serviceability and gauge for indication of full charge.	Fire extinguisher is not fully charged or is damaged.
32	Before		Tool Box	Check tool box for damage or loose or missing hardware.	
33	Before		Nozzle Assembly (Open Port)	a. Check nozzle for any damage that may cause leakage.	Nozzle has damage that may cause leakage.
				b. Check bonding cable for damage, cuts, or fraying.	Bonding cable is damaged, cut or frayed.
				c. Check dust cover for damage.	
34	Before		3 in. by 3.5 ft Discharge Hose	a. Check hose for any damage that may cause leakage.	Hose is damaged.
				b. Check coupling halves for damage.	Coupling half is damaged.
				c. Check dust cap, seal, and plugs for damage.	Seal is damaged or missing.
35	Before		Flange Adapter Assembly (D1)	a. Check nozzle for any damage that may cause leakage.	Nozzle has damage that may cause leakage.
				b. Check dust cover for damage.	
36	Before		4 to 3 in. Reducer	a. Check for any damage that may cause leakage.	Reducer has damage that may cause leakage.
				b. Check seal for damage.	Seal is missing or damaged.
	TOP				
37	Before		Manhole Cover	a. Check cover for leakage.	Class III fuel leak is found.
				b. Open cover access and check gasket for damage.	Gasket is damaged or missing.
				c. Close cover access and check for secure latching.	Cover cannot be securely latched.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
38	Before		Liquid Level Switch (Inside tank)	a. Open cover access and check liquid level switch for damage.	Liquid level switch is damaged or fuel lines are loose, cut, or deteriorated.
				b. Check liquid level switch for loose or missing hardware.	Liquid level switch has missing hardware.
				c. Check attached fuel lines for cuts or deterioration.	Attached fuel lines are damaged or deteriorated.
39	Before		Non-Valved Dry Break (Top Fill Port)	Check non-valved dry break and seal for any damage that may cause leakage.	Class III fuel leak is found.
40	Before		Spillbox	a. Check spillbox drains for clogs or restrictions.	Drains clogged.
				b. Check hose and valve for damage.	Class III fuel leak is found.
				c. Check ground studs.	Ground studs damaged or missing.
41	Before		Spillbox Valves	a. Check spillbox valves for damage.	Class III fuel leak is found.
				b. Check spill valve hoses for damage or cuts.	Class III fuel leak is found.
				c. Check spill valve hoses for loose or missing hardware.	Loose or missing hardware.
42	Before		Stowage Tube Assembly	a. Check stowage tube assembly for loose or missing hardware.	Stowage tube assembly missing hardware.
				b. Ensure gauge stick is present.	Gauge stick is not present.
43	Before		Vent Hood	a. Check vent hood for damage that may cause leakage.	Class III fuel leak is found.
				b. Check vent hood for loose or missing hardware.	Vent hood missing hardware.
44	Before		Battery Charger	a. Check battery charger for damage.	Battery charger damaged (if required for mission).
				b. Check battery charger wiring harness for damage, cuts, or fraying.	Battery charger wiring harness damaged, cut or frayed (if required for mission).
45	Before		Rear Catwalk	a. Check for loose or missing hardware.	Loose or missing hardware.
				b. Check catwalk for damage or broken welds.	Damaged or broken welds.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
				WARNING • Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. • Wet metal surfaces are slippery. Use caution when climbing on tank. Failure to comply could result in injury or death to personnel. • Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge. • Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face. • Failure to comply could result in injury or death to personnel. **NOTE** Refer to WP 0002 and WP 0004 for location of components.	
46	During		Tank Assembly	a. Check area around and under tank for leakage.	Class III fuel leak is found.
				b. Check V1 valve for leakage.	Class III fuel leak is found.
				c. Check V2 valve for leakage.	Class III fuel leak is found.
47	During		Tee Assembly (if in use)	a. Check tee assembly for leakage.	Class III fuel leak is found.
				b. Check coupling halves for leakage.	Class III fuel leak is found.
				c. Check butterfly valve for leakage.	Class III fuel leak is found.
48	During		4 to 3 in. Reducer (if in use)	Check 4 to 3 in. reducer for leakage.	Class III fuel leak is found.
49	During		3 in. by 3.5 ft Discharge Hose (if in use)	a. Check hose for leakage.	Class III fuel leak is found.
				b. Check coupling halves for leakage.	Class III fuel leak is found.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
50	During		Flange Adapter Assembly (if in use)	a. Check coupling halves for leakage.	Class III fuel leak is found.
				b. Check nozzle for leakage.	Class III fuel leak is found.
51	During		4 in. (10 cm) Suction Hoses (if in use)	a. Check hoses for leakage.	Class III fuel leak is found.
				b. Check coupling halves for leakage.	Class III fuel leak is found.
	RIGHT SIDE				
52	During		Bottom Load Valve Piping Assembly (Port G)	a. Check piping assembly for leakage	Class III fuel leak is found.
				b. Check V13 valve for leakage.	Class III fuel leak is found.
53	During		Bottom Load Inlet Piping Assembly (Port B)	a. Check piping assembly for leakage.	Class III fuel leak is found.
				b. Check V5 valve for leakage.	Class III fuel leak is found.
54	During		Coupling Half, Quick Disconnect (Port A)	Check coupling half for leakage.	Class III fuel leak is found.
	REAR				
55	During		Right Hand Discharge Arm (Port E)	a. Check discharge arm assembly for leakage.	Class III fuel leak is found.
				b. Check coupling halves for leakage.	Class III fuel leak is found.
				c. Check hoses for leakage.	Class III fuel leak is found.
56	During		Discharge Piping Assembly (Port C)	a. Check piping assembly for leakage.	Class III fuel leak is found.
				b. Check coupling halves for leakage.	Class III fuel leak is found.
				c. Check V7 valve for leakage.	Class III fuel leak is found.
57	During		Left Hand Discharge Arm (Port D)	a. Check discharge arm for leakage.	Class III fuel leak is found.
				b. Check coupling halves for leakage.	Class III fuel leak is found.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
58	During		Fuel Pump Assembly	a. Check fuel pump for leakage.	Class III fuel leak is found.
				b. Check V10 valve for leakage.	Class III fuel leak is found.
				c. Check piping assembly for leakage.	Class III fuel leak is found.
				WARNING • Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. • Wet metal surfaces are slippery. Use caution when climbing on tank. Failure to comply could result in injury or death to personnel. • Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge. • Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face. • Failure to comply could result in injury or death to personnel.	
				NOTE Refer to WP 0002 and WP 0004 for location of components.	
59	After		TRM Frame	a. Check TRM frame for damage and broken or cracked welds.	TRM frame has broken or cracked welds.
				b. Check installed ladders for loose or missing hardware.	Ladders have missing hardware.
				c. Check handles for loose or missing hardware.	Handles have missing hardware.
				d. Check roller assemblies for damage and loose or missing hardware.	Rollers are damaged or missing hardware (if required for mission).
				e. Check placards for damage, loose or missing hardware.	

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
59 (Con't)	After		TRM Frame	f. Check stenciling and data plate around frame for legibility.	
				g. Check hose trough for dents, loose or missing hardware.	
60	After		Tank Assembly	a. Check tank shell for dents leakage and broken welds.	Class III fuel leak is found.
				b. Check tank mounting hardware, isolation mounts and helical compression springs for loose or missing hardware.	
				c. Check area around and under tank for evidence of leakage.	Class III fuel leak is found.
				d. Check V1 valve for leakage.	Class III fuel leak is found.
				e. Check V2 valve for leakage.	Class III fuel leak is found.
				f. Check stenciling and data plates around tank for legibility.	
	RIGHT SIDE				
61	After		Bottom Load Valve Piping Assembly (Port G)	a. Check piping assembly for any damage that may cause leakage.	Class III fuel leak is found.
				b. Check V13 valve for leakage.	Class III fuel leak is found.
				c. Check piping assembly and V13 valve for loose or missing hardware.	Piping assembly or V13 valve has missing hardware.
				d. Check dust cap and seal for damage.	Seal is damaged or missing.
62	After		Right Hand Emergency Shutoff Lever	Check emergency shutoff lever operation. • Open V1 and V2 valves. • Pull right hand emergency shutoff lever and V1 and V2 valves. • Open V1 valve to reset emergency shutoff. • Close V1 valve.	Emergency shutoff lever does not shut V1 and V2 valves.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
63	After		NATO Slave Connector Box	a. Check connector box for loose or missing hardware.	NATO slave connector box is missing hardware (if required for mission).
				b. Check connector for damage or missing hardware.	Damaged or missing hardware.
64	After		Batteries	a. Remove battery box lid (WP 0033).	
				b. Check battery mounting for damage and loose or missing hardware.	Battery mounts have missing hardware.
				c. Check battery cables for loose, damaged or corroded connectors.	Batteries are damaged.
				d. Install battery box lid (WP 0033).	
65	After		Bottom Load Valve Piping Assembly (Port B)	a. Check piping assembly for any damage that may cause leakage.	Class III fuel leak is found.
				b. Check V5 valve for leakage or damage.	Class III fuel leak is found.
				c. Check piping assembly and V5 valve for loose or missing hardware.	Piping assembly or V5 valve has missing hardware.
				d. Check dust cap and seal for damage.	Seal is damaged or missing.
				e. Check VB1 valve for leakage or damage.	Class III fuel leak is found.
66	After		Coupling Half, Quick Disconnect (Port A)	a. Check piping assembly for any damage that may cause leakage.	Class III fuel leak is found.
				b. Check coupling half, quick disconnect for leakage or damage that may cause leakage.	Class III fuel leak is found.
				c. Check piping assembly and coupling half for loose or missing hardware.	Piping assembly or coupling half have missing hardware.
				d. Check dust cap and seal for damage.	Seal is damaged or missing.
				e. Check V6 valve for damage that may cause leakage.	Class III fuel leak is found.
				f. Check precheck tubing for damage that may cause leakage.	Class III fuel leak is found.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
67	After		Vapor Recovery Piping Assembly	a. Check piping assembly for dents, cracks, or damage.	Dented, cracked, or damaged.
				b. Check piping assembly for loose or missing hardware.	Loose or missing hardware.
				c. Check dust cap for damage and missing seal.	Seal is damaged or missing.
				d. Check vapor recovery piping assembly for leakage.	Class III fuel leak is found.
68	After		Side Mechanical Operator (V2 valve)	a. Check side control lever assembly for damage, loose, or missing hardware.	Control lever is damaged or missing hardware.
				b. Check pull cable tubing assembly for damage, bent, broken, or missing hardware.	Pull cable tubing has missing hardware.
				c. Check pull cables for cuts, fraying, or damage.	Pull cables are cut, frayed, or damaged.
69	After		Transporter Cover	Check transporter cover for damage or missing hardware.	
70	After		Ground Rod	a. Check for damaged or missing ground rod.	Ground rod is damaged or missing.
				b. Check ground rod mounting hardware for damage.	Ground rod mounting hardware damaged.
71	After		Drip Pans	a. Check that drip pans are present.	Drip pans are not present.
				b. Check drip pan mounting bracket for loose or missing hardware or damage.	
72	After		Control Lever Assembly (V1 valve)	a. Check control lever assembly (V1 valve) for damage, loose or missing hardware.	Control lever is damaged or hardware is missing.
				b. Check pull cable tubing for damage, or missing hardware.	Pull cable tubing damaged or missing hardware.
				c. Check pull cables for cuts, fraying, or damage.	Cables are cut, frayed, or damaged.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
	REAR				
73	After		Right Hand Discharge Arm (Port E)	a. Check discharge arm assembly for damage or leakage.	Class III fuel leak is found.
				b. Check hoses for any missing hardware or damage that may cause leakage.	Class III fuel leak is found.
				c. Check V12, V8 and V4 valves for damage that may cause leakage.	Class III fuel leak is found.
				d. Check piping assembly and V12, V8, and V4 valves for loose or missing hardware.	Piping assembly or V12, V8, or V4 valves have missing hardware.
				e. Check seals, unisex coupling, and all fittings for damage or leakage.	Class III fuel leak is found.
				f. Check dust cap and seal for damage.	Seal is damaged or missing.
74	After		Static Ground Reel Assemblies	a. Check reels for damage, loose or missing hardware.	Reel is missing hardware, or is damaged.
				b. Check grounding cable for cuts, fraying, or damage.	Grounding cable is cut, frayed, or damaged.
75	After		Camlock Adapter	a. Check camlock adapter for damage that may cause leakage.	Camlock adapter has damage that may cause leakage.
				b. Check butterfly valve for damage that may cause leakage.	Butterfly valve has damage that may cause leakage.
				c. Check gasket for damage or deterioration.	Gasket is deteriorated or missing.
				d. Check tiedown straps for serviceability.	
				e. Check dust caps, seals, and plug for damage.	Seal is damaged or missing.
76	After		Fire Extinguisher	a. Ensure fire extinguisher is present.	Fire extinguisher is not present.
				b. Check fire extinguisher for serviceability and gauge for indication of full charge.	Fire extinguisher is not fully charged or is damaged.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
77	After		Discharge Piping Assembly (Port C)	a. Check piping assembly for any damage that may cause leakage.	Class III fuel leak is found.
				b. Check V7 valve for leakage or damage.	Class III fuel leak is found.
				c. Check VB2 valve for leakage or damage.	Class III fuel leak is found.
				d. Check piping assembly and V7 valve for loose or missing hardware.	Piping assembly or V7 valve have missing hardware.
				e. Check dust cap and seal for damage.	Seal is damaged or missing.
78	After		Fuel Pump Assembly	a. Check fuel pump for any damage that may cause leakage.	Class III fuel leak is found.
				b. Check hoses for missing hardware and damage that may cause leakage.	Class III fuel leak is found.
				c. Check V10 valve for any damage that may cause leakage.	Class III fuel leak is found.
				d. Check piping assembly and V10 valve for loose or missing hardware.	Piping assembly or valves V10 have missing hardware.
				e. Check fuel pump assembly wiring harness and EMI box for damage or missing parts.	Harness or EMI box damaged or missing (if required for mission).
79	After		Rear Head Tank Gauge	a. Check tank pointer for loose or missing hardware.	Loose or missing hardware.
				b. Check tank pointer for damage.	Tank pointer is damaged or does not operate correctly.
80	After		Left Hand Discharge Arm (Port D)	a. Check discharge arm for damage or leakage.	Class III fuel leak is found.
				b. Check hoses for any damage that may cause leakage.	Class III fuel leak is found.
				c. Check V11, V9, and V3 valves for damage that may cause leakage.	Class III fuel leak is found.
				d. Check seals, unisex coupling, and all fittings for damage or leakage.	Class III fuel leak is found.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
80 (Con't)	After		Left Hand Discharge Arm (Port D)	e. Check dust cap and seal for damage.	Seal is damaged or missing.
				f. Check piping assembly and V11, V9, and V3 valves for loose or missing hardware.	Piping assembly or V11, V9, or V3 valves have missing hardware.
81	After		Tee Assembly	a. Check tee assembly for damage that may cause leakage.	Tee assembly has damage that may cause leakage.
				b. Check butterfly valve for damage that may cause leakage.	Butterfly valve has damage that may cause leakage.
				c. Check tiedown straps for serviceability.	
				d. Check dust caps, seals, and plug for damage.	Seal is damaged or missing.
	LEFT SIDE				
82	After		4 in. (10 cm) Suction Hose	a. Check all hoses for any damage that may cause leakage.	Hose is damaged.
				b. Check coupling halves for damage.	Coupling half is damaged.
				c. Check dust caps, seals, and plugs for damage.	Seal is damaged or missing.
83	After		2 in. (5 cm) Discharge Hoses	a. Check hoses for any damage that may cause leakage.	Hose is damaged.
				b. Check dry break couplings for damage.	Dry break coupling damaged.
				c. Check dust cap, seal, and plugs for damage.	Seal is damaged or missing.
84	After		ISO Ladder	Check ISO ladder for damage.	ISO ladder is damaged.
85	After		Left Hand Emergency Shutoff Lever	Check emergency shutoff lever operation. • Open V1 and V2 valves. • Pull left hand emergency shutoff lever and V1 and V2 valves. • Open V1 valve to reset emergency shutoff. • Close V1 valve.	Emergency shutoff lever does not shut V1 and V2 valves.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
	FRONT				
86	After		Spill Containment Kit	Check that spill containment kit is present and secure.	Spill containment kit is missing.
87	After		Fire Extinguisher	a. Ensure fire extinguisher is present.	Fire extinguisher is not present.
				b. Check fire extinguisher for serviceability and gauge for indication of full charge.	Fire extinguisher is not fully charged or is damaged.
88	After		Tool Box	Check tool box for damage or loose or missing hardware.	
89	After		Nozzle Assembly (Open Port)	a. Check nozzle for any damage that may cause leakage.	Nozzle has damage that may cause leakage.
				b. Check bonding cable for damage, cuts, or fraying.	Bonding cable is damaged, cut, or frayed.
				c. Check dust cover for damage.	
90	After		3 in. by 3.5 ft Discharge Hose	a. Check hose for any damage that may cause leakage.	Hose is damaged.
				b. Check dust cap, seal, and plugs for damage.	Seal is damaged or missing.
91	After		Flange Adapter Assembly (D1)	a. Check nozzle for any damage that may cause leakage.	Nozzle has damage that may cause leakage.
				b. Check dust cover for damage.	
92	After		4 to 3 in. Reducer	a. Check reducer for any damage that may cause leakage.	Reducer has damage that may cause leakage.
				b. Check seal for damage.	Seal is missing or damaged.
	TOP				
93	After		Manhole Cover	a. Check cover for leakage.	Class III fuel leak is found.
				b. Open cover access and check gasket for damage.	Gasket is damaged or missing.
				c. Close cover access and check for secure latching.	Cover cannot be securely latched.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
94	After		Liquid Level Switch (inside tank)	a. Open cover access and check liquid level switch for damage.	Liquid level switch is damaged or fuel lines are loose, cut, or deteriorated.
				b. Check liquid level switch for loose or missing hardware.	Liquid level switch has missing hardware.
				c. Check attached fuel lines for cuts or deterioration.	Attached fuel lines are damaged or deteriorated.
95	After		Non-Valved Dry Break (Top Fill Port)	a. Check bumper for damage or deterioration.	Class III fuel leak is found.
				b. Check non-valved dry break and seal for any damage that may cause leakage.	Class III fuel leak is found.
96	After		Spillbox	a. Check spillbox drains for clogs or restrictions.	Drains clogged.
				b. Check hose and valve for damage.	Class III fuel leak is found.
				c. Check ground studs.	Ground stud damaged or missing.
97	After		Spillbox Valves	a. Check spillbox valves for damage.	Class III fuel leak is found.
				b. Check spill valve hoses for damage or cuts.	Class III fuel leak is found.
				c. Check spill valve hoses for loose or missing hardware.	Loose or missing hardware.
98	After		Stowage Tube Assembly	a. Check stowage tube assembly for loose or missing hardware.	Stowage tube assembly missing hardware.
				b. Ensure gauge stick is present.	Gauge stick is not present.
99	After		Vent Hood	a. Check vent hood for damage that may cause leakage.	Class III fuel leak is found.
				b. Check vent hood for loose or missing hardware.	
100	After		Battery Charger	a. Check battery charger for damage.	Battery charger damaged.
				b. Check battery charger wiring harness for damage, cuts, or fraying.	Battery charger wiring harness damaged, cut, or frayed.

Table 1. Preventive Maintenance Checks and Services - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
101	After		Rear Catwalk	a. Check for loose or missing hardware. b. Check catwalk for damage or broken welds.	Rear catwalk has missing hardware. Rear catwalk has broken welds.

END OF WORK PACKAGE

OPERATOR MAINTENANCE

ROLLERS REPLACEMENT
Removal, Installation

INITIAL SETUP

Personnel Required
Petroleum Supply Specialist 92F (2)

References
WP 0118

Equipment Condition
TRM shut down (WP 0022)
TRM mounted on PLS/LHS (WP 0013)

REMOVAL

1. Remove two pin locks (Figure 1, Item 5) securing two pins (Figure 1, Item 2) in roller (Figure 1, Item 4) and TRM (Figure 1, Item 1).
2. Remove two pins (Figure 1, Item 2) with lanyards (Figure 1, Item 3) from roller (Figure 1, Item 4) and TRM (Figure 1, Item 1).
3. Remove roller (Figure 1, Item 4) from TRM frame (Figure 1, Item 1).

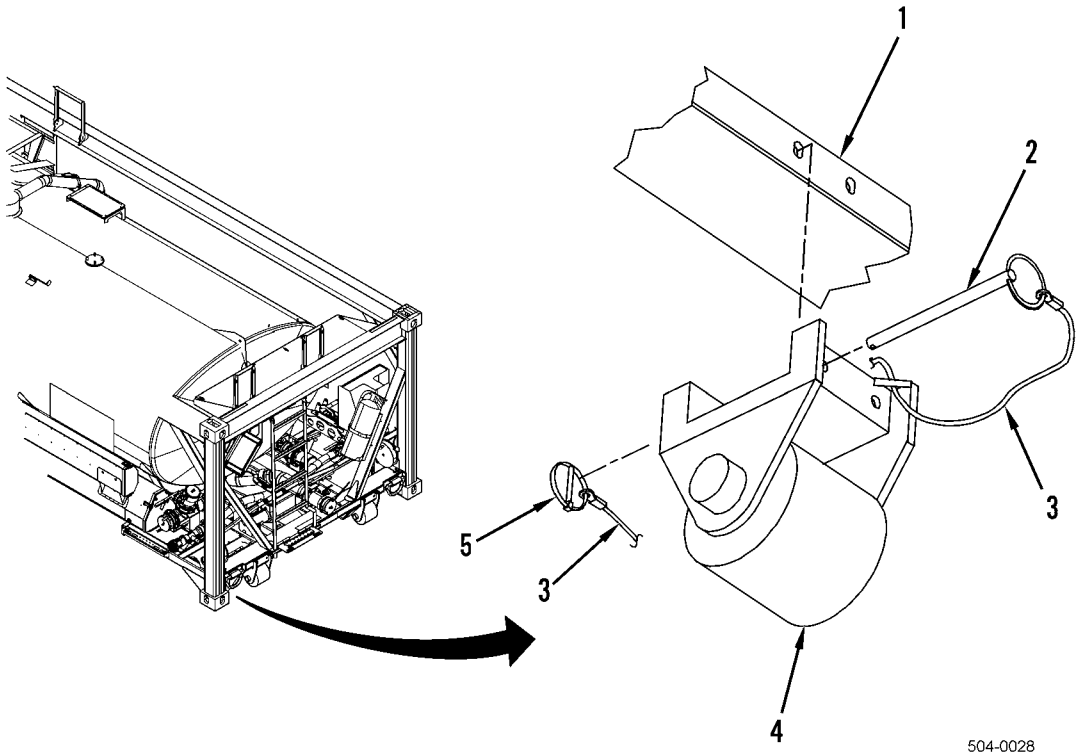


Figure 1. Roller.

END OF TASK

INSTALLATION

1. Position roller (Figure 2, Item 4) on TRM frame (Figure 2, Item 1).
2. Install two pins (Figure 2, Item 2) through holes in roller (Figure 2, Item 4) and TRM (Figure 2, Item 1).
3. Route two lanyards (Figure 2, Item 3) over TRM frame (Figure 2, Item 1).
4. Install two pin locks (Figure 2, Item 5) securing two pins (Figure 2, Item 2) in roller (Figure 2, Item 4) and TRM (Figure 2, Item 1).

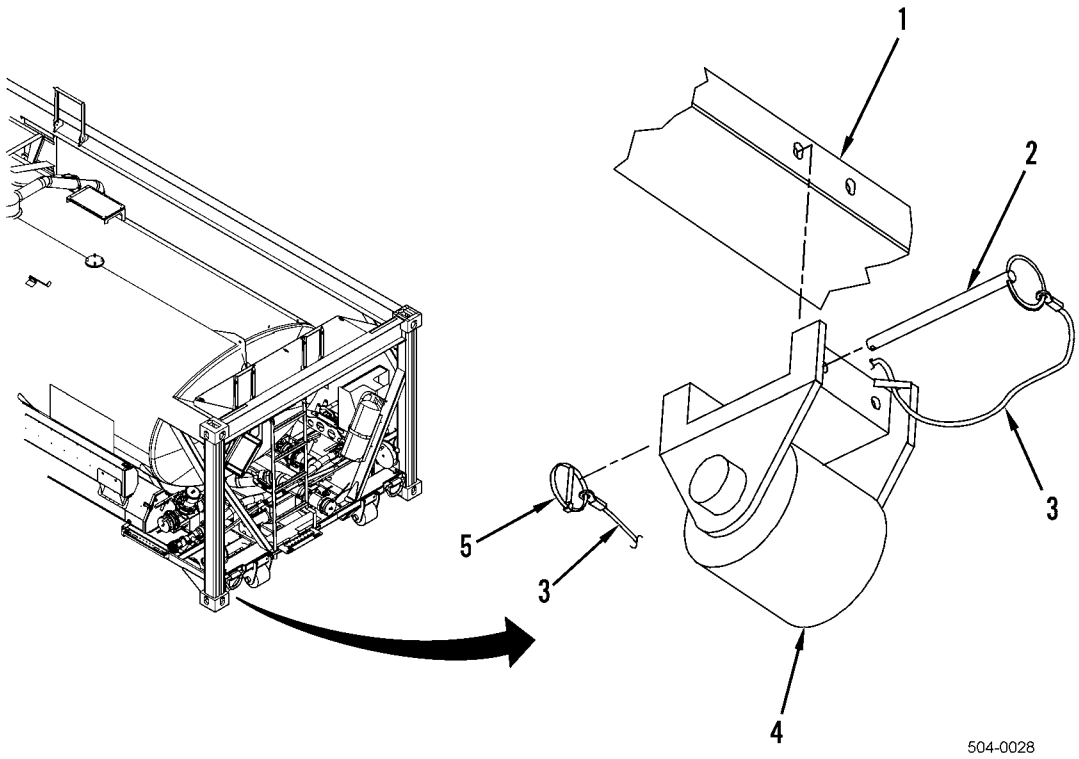


Figure 2. Roller.

END OF TASK

END OF WORK PACKAGE

OPERATOR MAINTENANCE

BATTERY BOX LID REMOVAL/INSTALLATION
Removal, Installation

INITIAL SETUP

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

Equipment Condition

TRM shut down (WP 0022)

Personnel Required

Petroleum Supply Specialist 92F

REMOVAL

1. Loosen two knobs (Figure 1, Item 2) securing battery box lid (Figure 1, Item 1) to battery box (Figure 1, Item 3).
2. Remove battery box lid (Figure 1, Item 1) from battery box (Figure 1, Item 3).

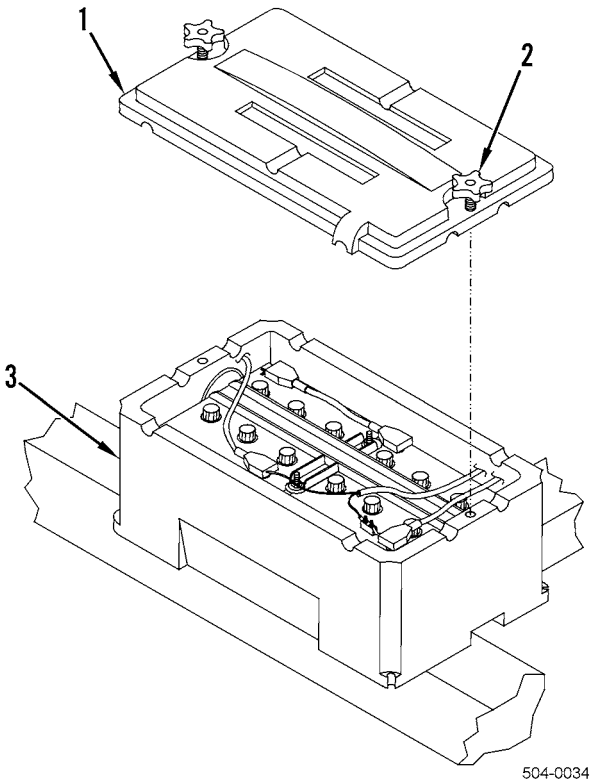


Figure 1. Battery Box Lid.

END OF TASK

INSTALLATION

1. Install battery box lid (Figure 2, Item 1) on battery box (Figure 2, Item 3).
2. Tighten two knobs (Figure 2, Item 2) to secure battery box lid (Figure 2, Item 1) on battery box (Figure 2, Item 3).

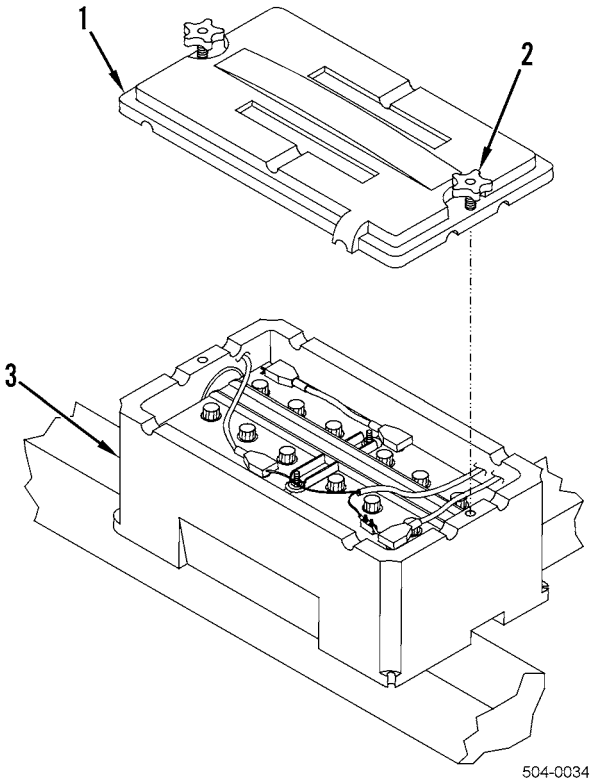


Figure 2. Battery Box Lid.

END OF TASK

END OF WORK PACKAGE

OPERATOR MAINTENANCE

FUEL SYSTEM COUPLING AND DUST CAP GASKETS REPLACEMENT
Replace Gaskets in Camlock Couplings, Replace Gasket in Dry Break Coupling

INITIAL SETUP

Tools and Special Tools

Knife, putty (WP 0152, Table 2, Item 3)

Materials/Parts

Cloth, cleaning (WP 0153, Item 5)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)

Personnel Required

Petroleum Supply Specialist 92F

References

WP 0012
WP 0139
WP 0140

Equipment Condition

TRM shut down (WP 0022)

REPLACE GASKETS IN CAMLOCK COUPLINGS

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

REPLACE GASKETS IN CAMLOCK COUPLINGS – CONTINUED

1. Place drip pans under quick disconnect coupling halves (Figure 1, Item 3) and (Figure 1, Item 5).
2. Remove dust cap (Figure 1, Item 4) and dust plug (Figure 1, Item 1).
3. Remove gaskets (Figure 1, Item 2) from dust cap (Figure 1, Item 4) and quick disconnect coupling half (Figure 1, Item 5).
4. Discard gaskets (Figure 1, Item 2) if defective.
5. Clean quick disconnect coupling halves (Figure 1, Items 3 and 5) and dust caps (Figure 1, Items 1 and 4).
   a. Remove all buildup of dirt, oil, and debris from all mating surfaces and clamping areas using a putty knife.
   b. Clean all metallic parts with a cleaning cloth.
6. Inspect quick disconnect coupling halves (Figure 1, Items 3 and 5) and dust caps (Figure 1, Items 1 and 4).
   a. Inspect all metallic parts for cracks, corrosion, or broken fittings. If cracks, corrosion, or broken fittings are found, contact Field Maintenance.
   b. Inspect all split rings (Figure 1, Item 6) and chains (Figure 1, Item 7) for cracks, distortion, and corrosion. If cracks, distortion, or corrosion is found, contact Field Maintenance.
7. Install gaskets (Figure 1, Item 2) in dust cap (Figure 1, Item 4) and quick disconnect coupling half (Figure 1, Item 5).
8. Install dust cap (Figure 1, Item 4) on quick disconnect coupling half (Figure 1, Item 3).
9. Install dust plug (Figure 1, Item 1) in quick disconnect coupling half (Figure 1, Item 5).

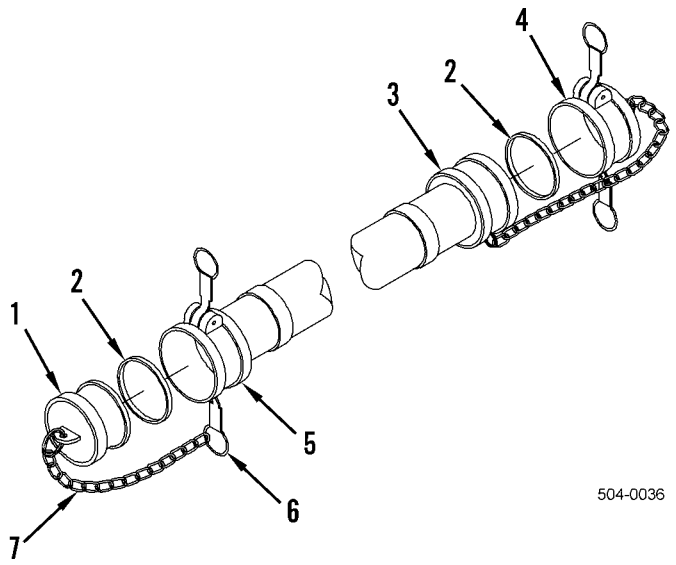


Figure 1. Quick Disconnect Couplings.

10. Remove drip pan and dispose of fuel per local procedures.

END OF TASK

REPLACE GASKET IN DRY BREAK COUPLING

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

CAUTION

Use caution when removing gaskets to prevent damage to equipment.

NOTE

It may be necessary to perform hose evacuation to prevent a fuel spill when replacing gaskets in a discharge hose with fuel in it (WP 0012).

1. Place drip pan under coupling half (Figure 2, Item 3).
2. Remove dust cap (Figure 2, Item 4) from coupling half (Figure 2, Item 3).
3. Remove bumper (Figure 2, Item 1).
4. Remove gasket (Figure 2, Item 2).
5. Remove gasket (Figure 2, Item 5).

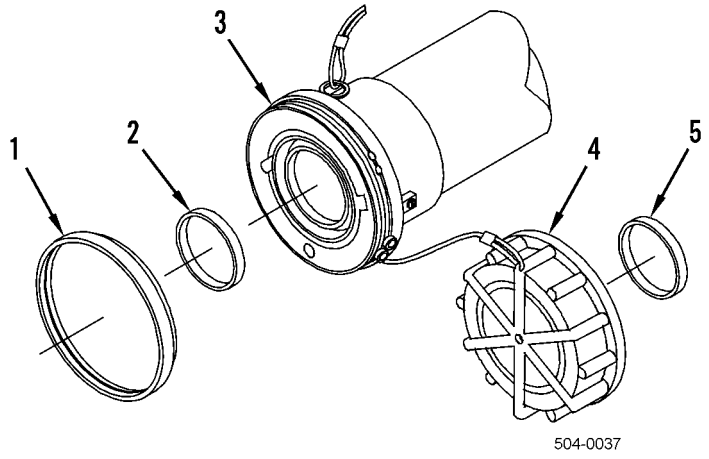


Figure 2. TRM Coupling with Dry Break Coupling.

REPLACE GASKET IN DRY BREAK COUPLING – CONTINUED

6. Clean coupling half (Figure 3, Item 3) and dust cap (Figure 3, Item 4).
   a. Remove all buildup of dirt, oil, and debris from all mating surfaces and clamping areas using a putty knife.
   b. Clean all parts with a cleaning cloth.
7. Inspect coupling half (Figure 3, Item 3) and dust cap (Figure 3, Item 4).
   a. Inspect all parts for cracks, corrosion, or broken fittings. If cracks, corrosion, or broken fittings are found, contact Field Maintenance.
   b. Inspect all wire cables for cracks, frays, distortion, and corrosion. If cracks, frays, distortion, or corrosion is found, contact Field Maintenance.
8. Install gasket (Figure 3, Item 5) in dust cap (Figure 3, Item 4).
9. Install gasket (Figure 3, Item 2) on coupling half (Figure 3, Item 3).
10. Install bumper (Figure 3, Item 1) on coupling half (Figure 3, Item 3).

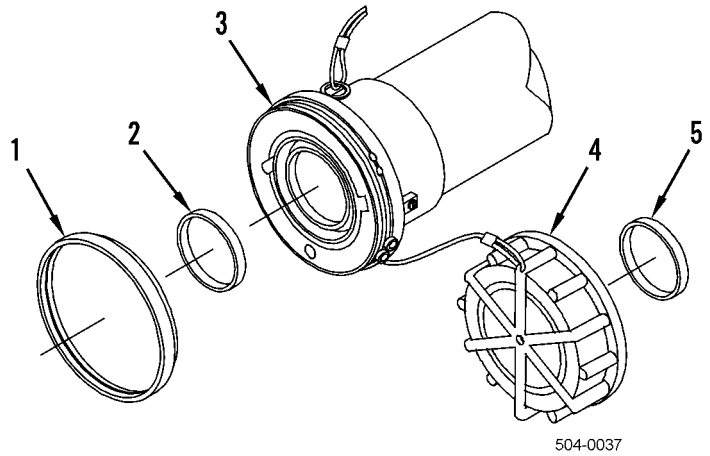


Figure 3. TRM Coupling with Dry Break Coupling.

11. Install dust cap (Figure 3, Item 4) on coupling half (Figure 3, Item 3).
12. Remove drip pan and dispense of fuel per local procedures.

END OF TASK

END OF WORK PACKAGE

CHAPTER 5

FIELD MAINTENANCE TROUBLESHOOTING PROCEDURES

FIELD MAINTENANCE

FIELD TROUBLESHOOTING INDEX

MALFUNCTION/SYMPTOM	TROUBLESHOOTING PROCEDURE PAGE
1. Fuel Leakage Evident.	WP 0036-2
2. Static Spark Noted at Fuel Dispensing Nozzle.	WP 0036-2
3. Fuel Does Not Flow Into Tank.	WP 0036-2
4. Tank Will Not Fill or Stops Filling Before Reaching 2,500 Gallon Capacity.	WP 0036-2
5. Fuel Leaks During Transport.	WP 0036-2
6. V1 Valve Leaks at Gasket.	WP 0036-2
7. Fuel Leaks from Precheck Ball Valve.	WP 0036-2
8. Bottom Load Valve Piping Assembly Leaks.	WP 0036-3
9. Camlock Adapter Leaks Fuel.	WP 0036-3
10. Camlock Adapter Will Not Connect with Other Components.	WP 0036-3
11. Fuel Leaks from Quick Disconnect Coupling Half.	WP 0036-3
12. Fuel Leaks from Bottom Load Inlet Pipe Assembly.	WP 0036-3
13. Fuel Leaks from Inlet Piping Butterfly Valve.	WP 0036-3
14. V2 Valve Leaks at Gasket.	WP 0036-3
15. V2 Valve Will Not Automatically Close.	WP 0036-4
16. V2 Valve Will Not Automatically Open.	WP 0036-4
17. Discharge Piping Assembly Leaks at 1 in. (2.54 cm) Discharge Hose.	WP 0036-4
18. Discharge Piping Assembly Leaks at 2 in. (5.08 cm) Discharge Fuel Hose.	WP 0036-4
19. Discharge Piping Assembly Leaks at Couplings.	WP 0036-4
20. Butterfly Valve Leaks at Discharge Piping Assembly Connection.	WP 0036-4
21. Discharge Arm Assembly Leaks.	WP 0036-5
22. Discharge or Suction Hose Leaks.	WP 0036-5
23. Tee Assembly Leaks.	WP 0036-5
24. Tee Assembly Will Not Connect with Other Components.	WP 0036-5
25. Non-Valved Dry Break Coupling Assembly Leaks.	WP 0036-5
26. Non-Valved Dry Break Coupling Assembly Will Not Connect with Other Components.	WP 0036-6
27. Valved Dry Break Coupling Assembly Leaks.	WP 0036-6
28. Valved Dry Break Coupling Assembly Will Not Connect with Other Components.	WP 0036-6
29. Nozzle Assembly Leaks.	WP 0036-6
30. Nozzle Assembly Will Not Connect with Other Components.	WP 0036-6
31. Fuel Pump Motor Does Not Run.	WP 0036-6
32. Fuel Pump Motor Runs, But No Flow.	WP 0036-7
33. Low Flow Rate.	WP 0036-8
34. Fuel Pump Motor Stalls When Nozzle is Closed.	WP 0036-8
35. Fuel Leaks From Inlet or Return Hose.	WP 0036-8
36. Fuel Leaks From Fuel Pump Assembly.	WP 0036-8

MALFUNCTION/SYMPTOM **TROUBLESHOOTING PROCEDURE PAGE**

37. Motor Overheats. . . . . WP 0036-9
38. V1 Valve Will Not Open Manually. . . . . WP 0036-9
39. V2 Valve Will Not Open Manually. . . . . WP 0036-9
40. Vent Valve Does Not Open When V2 is Opened. . . . . WP 0036-9

END OF WORK PACKAGE

FIELD MAINTENANCE

FIELD TROUBLESHOOTING PROCEDURES

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J
Petroleum Supply Specialist 92F

References

FM 10-67-1
TM 9-6140-200-14
WP 0027
WP 0033
WP 0055
WP 0056
WP 0065
WP 0067
WP 0069
WP 0071
WP 0073

References - Continued

WP 0074
WP 0075
WP 0076
WP 0077
WP 0078
WP 0080
WP 0081
WP 0083
WP 0084
WP 0085
WP 0087
WP 0088
WP 0092
WP 0093
WP 0097
WP 0098
WP 0099
WP 0100
WP 0102

Equipment Condition

TRM set on level ground

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

SYMPTOM
MALFUNCTION
CORRECTIVE ACTION

1. FUEL LEAKAGE EVIDENT.

Fuel leakage.

Repair and replace damaged equipment as required.

2. STATIC SPARK NOTED AT FUEL DISPENSING NOZZLE.

Nozzle not grounded properly.

a. Ground equipment properly (FM 10-67-1).
b. Repair and replace damaged equipment as required.

3. FUEL DOES NOT FLOW INTO TANK.

Inlet piping assembly butterfly valve defective.

Replace inlet piping assembly butterfly valve (WP 0085).

V2 valve defective.

Replace V2 valve (WP 0087).

V2 valve main piston is jammed.

Replace V2 valve (WP 0087).

4. TANK WILL NOT FILL OR STOPS FILLING BEFORE REACHING 2,500 GALLON CAPACITY.

V6 valve open.

Open V6 valve.

Loose connections at liquid level switch.

a. Tighten connections (WP 0067).
b. If condition still exists, replace liquid level switch (WP 0067).

5. FUEL LEAKS DURING TRANSPORT.

Deteriorated vent gasket.

Replace vent gasket (WP 0065).

6. V1 VALVE LEAKS AT GASKET.

Defective gasket.

Replace defective gasket (WP 0088).

7. FUEL LEAKS FROM PRECHECK BALL VALVE.

Defective precheck ball valve.

Replace precheck ball valve (WP 0083).

SYMPTOM
MALFUNCTION
CORRECTIVE ACTION

8. BOTTOM LOAD VALVE PIPING ASSEMBLY LEAKS.

Couplings are defective or damaged.

Replace defective coupling (WP 0081).

Bottom load valve piping assembly is defective or damaged.

Replace bottom load valve piping (WP 0081).

9. CAMLOCK ADAPTER LEAKS FUEL.

Camlock adapter connectors are improperly fastened.

a. Properly fasten camlock adapter.
b. If condition still exists, repair or replace damaged equipment as required (WP 0100).

10. CAMLOCK ADAPTER WILL NOT CONNECT WITH OTHER COMPONENTS.

Camlock adapter is damaged or defective.

Repair or replace damaged equipment as required (WP 0100).

11. FUEL LEAKS FROM QUICK DISCONNECT COUPLING HALF.

Deteriorated gasket.

Replace gasket (WP 0084).

Defective quick disconnect coupling half.

Replace quick disconnect coupling half (WP 0084).

12. FUEL LEAKS FROM BOTTOM LOAD INLET PIPE ASSEMBLY.

Deteriorated coupling seal.

Replace coupling seal (WP 0081).

Damaged quick disconnect coupling half.

Repair or replace quick disconnect coupling half (WP 0084).

Damaged inlet piping assembly butterfly valve.

Repair or replace inlet piping assembly butterfly valve (WP 0085).

13. FUEL LEAKS FROM INLET PIPING BUTTERFLY VALVE.

Damaged gaskets.

Replace gaskets (WP 0085).

Defective butterfly valve.

Replace butterfly valve (WP 0085).

14. V2 VALVE LEAKS AT GASKET.

Defective gasket.

Replace gasket (WP 0087).

SYMPTOM
MALFUNCTION
CORRECTIVE ACTION

15. V2 VALVE WILL NOT AUTOMATICALLY CLOSE.

Defective liquid level switch.

Replace liquid level switch (WP 0067).

Defective V2 valve.

Replace V2 valve (WP 0087).

16. V2 VALVE WILL NOT AUTOMATICALLY OPEN.

V6 valve open.

Close V6 valve.

V2 valve defective.

Replace V2 valve (WP 0087).

17. DISCHARGE PIPING ASSEMBLY LEAKS AT 1 IN. (2.54 CM) DISCHARGE HOSE.

1 in. (2.54 cm) discharge fuel hose is loose or improperly installed.

Tighten 1 in. (2.54 cm) discharge fuel hose on discharge piping assembly (WP 0073).

1 in. (2.54 cm) discharge fuel hose is damaged or defective.

Replace 1 in. (2.54 cm) discharge fuel hose on discharge piping assembly (WP 0073).

18. DISCHARGE PIPING ASSEMBLY LEAKS AT 2 IN. (5.08 CM) DISCHARGE FUEL HOSE.

2 in. (5.08 cm) discharge fuel hose is loose or improperly installed.

Tighten 2 in. (5.08 cm) discharge fuel hose on discharge piping assembly (WP 0073).

2 in. (5.08 cm) discharge fuel hose damaged or defective.

Replace 2 in. (5.08 cm) discharge fuel hose on discharge piping assembly (WP 0073).

19. DISCHARGE PIPING ASSEMBLY LEAKS AT COUPLINGS.

Couplings are loose or improperly installed.

Tighten coupling on discharge piping assembly (WP 0069).

Couplings are defective or damaged.

Replace coupling assembly on discharge piping assembly (WP 0069).

Discharge piping assembly is defective or damaged.

Replace discharge piping assembly as required (WP 0069).

20. BUTTERFLY VALVE LEAKS AT DISCHARGE PIPING ASSEMBLY CONNECTION.

Gasket between discharge piping assembly and butterfly valve is defective or damaged.

Replace discharge piping assembly butterfly valve gasket (WP 0071).

Butterfly valve is defective or damaged.

Replace butterfly valve (WP 0071).

SYMPTOM
MALFUNCTION
CORRECTIVE ACTION

21. DISCHARGE ARM ASSEMBLY LEAKS.

Couplings are loose or improperly installed.

Tighten left hand or right hand discharge arm assembly coupling (WP 0073).

Couplings are defective or damaged.

a. Replace left or right hand discharge arm assembly seals as required (WP 0073).
b. If condition still exists, replace left hand or right hand discharge arm assembly coupling (WP 0073).

Discharge arm assembly leaks at joints and connections.

a. Repair left or right hand discharge arm assembly seals as required (WP 0073).
b. If condition still exists, replace left hand or right hand discharge arm assembly coupling (WP 0073).

Discharge arm assembly leaks at valves.

Replace valve as necessary (WP 0073).

22. DISCHARGE OR SUCTION HOSE LEAKS.

Hose damaged or defective.

a. Repair hose (WP 0097 or WP 0098).
b. Replace hose.

23. TEE ASSEMBLY LEAKS.

Tee assembly gasket leaks.

a. Replace tee assembly gasket (WP 0102).
b. Defective butterfly valve. Replace butterfly valve (WP 0102).

24. TEE ASSEMBLY WILL NOT CONNECT WITH OTHER COMPONENTS.

Tee assembly damaged or defective.

Repair tee assembly (WP 0102).

25. NON-VALVED DRY BREAK COUPLING ASSEMBLY LEAKS.

Coupling assembly loose or improperly installed.

Tighten coupling assembly (WP 0075).

Dust cap missing.

Install dust cap (WP 0075).

Missing or damaged seal.

Replace seal (WP 0075).

SYMPTOM
MALFUNCTION
CORRECTIVE ACTION

26. NON-VALVED DRY BREAK COUPLING ASSEMBLY WILL NOT CONNECT WITH OTHER COMPONENTS.

Non-valved dry break coupling assembly damaged or defective.

Replace non-valved dry break coupling assembly (WP 0074).

27. VALVED DRY BREAK COUPLING ASSEMBLY LEAKS.

Coupling assembly loose or improperly installed.

Tighten coupling assembly (WP 0073).

Dust cap missing.

Install dust cap (WP 0073).

Missing or damaged seal.

Replace seal (WP 0073).

28. VALVED DRY BREAK COUPLING ASSEMBLY WILL NOT CONNECT WITH OTHER COMPONENTS.

Valved dry break coupling assembly damaged or defective.

Replace valved dry break coupling assembly (WP 0073).

29. NOZZLE ASSEMBLY LEAKS.

Nozzle assembly leaking at dry break coupling.

Repair nozzle assembly (WP 0099).

30. NOZZLE ASSEMBLY WILL NOT CONNECT WITH OTHER COMPONENTS.

Nozzle assembly defective or damaged.

Replace nozzle assembly (WP 0099).

31. FUEL PUMP MOTOR DOES NOT RUN.

Batteries are defective.

a. Test and charge batteries (TM 9-6140-200-14).
b. If batteries will not hold charge, replace batteries (WP 0055).
c. If motor still does not run, proceed to next malfunction.

Circuit breaker tripped or defective.

a. Remove battery box lid (WP 0033).
b. Reset circuit breaker if necessary (WP 0080).
c. Check continuity of circuit breaker (WP 0080).
d. If circuit breaker is defective, replace circuit breaker (WP 0080).
e. If circuit breaker is not defective, assemble and install circuit breaker (WP 0080) and proceed to next malfunction.

SYMPTOM
MALFUNCTION
CORRECTIVE ACTION

31. FUEL PUMP MOTOR DOES NOT RUN - CONTINUED.

Wiring harness is defective.

a. Remove battery negative cable and fuel pump negative (black) wire (WP 0056-2, steps 1-3).
b. Remove switch cover (WP 0078).
c. Connect battery negative cable and fuel pump negative (black) wire (WP 0056-6, steps 16, 18-20).
d. Check for voltage at bottom switch terminal (red lead to positive switch terminal, black lead to ground).
    1. If 24 VDC or more volts are not present, replace wiring harness (WP 0079).
    2. If 24 VDC or more volts are present, proceed to next malfunction.

Fuel pump switch is defective.

a. Check fuel pump switch for continuity (WP 0078).
b. If there is no continuity, replace fuel pump switch (WP 0078).
c. If motor still does not run, proceed to next malfunction.

Pump is defective.

Replace fuel pump assembly (WP 0077).

32. FUEL PUMP MOTOR RUNS, BUT NO FLOW.

NOTE

Refer to data plate for various conditions (WP 0027).

V1 valve not open.

Open V1 valve.

No flow from Port D.

a. Open V3 and V11 valves.
b. Open remaining valve on discharge hose.

No flow from Port E.

a. Open V4 and V12 valves.
b. Open remaining valves on discharge hose.

Motor defective.

Replace fuel pump assembly (WP 0077).

SYMPTOM
MALFUNCTION
CORRECTIVE ACTION

33. LOW FLOW RATE.

Low voltage.

a. Test and charge batteries (TM 9-6140-200-14).
b. If batteries will not hold charge, replace batteries (WP 0055).
c. If there is still a low flow rate, proceed to next malfunction.

Clogged fuel pump strainer.

a. Check and clean strainer (WP 0076).
b. If there is still a low flow rate, proceed to next malfunction.

Vanes worn or sticking.

Replace fuel pump assembly (WP 0077).

34. FUEL PUMP MOTOR STALLS WHEN NOZZLE IS CLOSED.

Motor 30-minute duty cycle exceeded.

Shut off motor and allow to cool for 30 minutes.

Low voltage.

a. Test and charge batteries (TM 9-6140-200-14).
b. If batteries will not hold charge, replace batteries (WP 0055).
c. If fuel pump motor continues to stall, proceed to next malfunction.

Motor defective.

Replace fuel pump assembly (WP 0077).

35. FUEL LEAKS FROM INLET OR RETURN HOSE.

Hose clamps loose.

Check and tighten all hose clamps on fuel pump (WP 0077).

Hose damaged.

Replace defective hose (WP 0077) as required.

36. FUEL LEAKS FROM FUEL PUMP ASSEMBLY.

Fuel pump assembly damaged.

Replace fuel pump assembly (WP 0077).

SYMPTOM
MALFUNCTION
CORRECTIVE ACTION

37. MOTOR OVERHEATS.

V1 valve closed.

Open V1 valve.

Motor 30-minute duty cycle exceeded.

Shut off motor and allow to cool for 30 minutes.

Motor failure.

Replace fuel pump assembly (WP 0077).

38. V1 VALVE WILL NOT OPEN MANUALLY.

Cable defective.

a. Check cable connection and tighten if needed.
b. Replace cable (WP 0092).

V1 valve defective.

Replace V1 valve (WP 0088).

39. V2 VALVE WILL NOT OPEN MANUALLY.

Cable defective.

a. Check cable connection and tighten if needed.
b. Replace cable (WP 0093).

V2 valve defective.

Replace V2 valve (WP 0087).

40. VENT VALVE DOES NOT OPEN WHEN V2 IS OPENED.

Cable defective.

Replace cable (WP 0093).

Push rod defective.

Replace push rod (WP 0065).

END OF WORK PACKAGE

CHAPTER 6

FIELD MAINTENANCE INSTRUCTIONS

FIELD MAINTENANCE

SERVICE UPON RECEIPT

General, Emplacement, Unpacking, Check Unpacked Equipment, Installation Instructions, Assemble Equipment, Preliminary Servicing of Equipment

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

DA PAM 750-8
SF 361
WP 0039

GENERAL

1. The following paragraphs contain the procedures for unpacking and general checking of TRM.
2. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on SF 361, Transportation Discrepancy Report.
3. Check equipment against the packing slip to ensure that the shipment is complete. Report all discrepancies in accordance with applicable service instructions in DA PAM 750-8.

EMPLACEMENT

CAUTION

The TRM should be assembled on a level area free of debris and large rocks. Special care should be taken to ensure that no hose assemblies will be placed on or near rocks or other objects that may have sharp points or edges which may damage the hose assemblies when the fuel system is operated. Be sure that the site allows for enough room to assemble the fuel system. Failure to comply may cause damage to equipment.

UNPACKING

Unpack TRM; refer to shipping documents.

CHECK UNPACKED EQUIPMENT

Inspect equipment per Table 1.

Table 1. Equipment Inspection.

COMPONENT	ACCEPTABLE	REPAIRABLE	NONREPARABLE
TRM	Free from major damage.	Any damage that does not affect the serviceability of the TRM.	Major damage that affects the serviceability of the TRM.
Couplings	Minor rust or corrosion that would not impair serviceability of the couplings.	Minor rust or corrosion that can be removed without affecting the serviceability of the couplings.	Rust, damage, or corrosion that affects serviceability of the couplings.
Valve Assemblies	Minor rust or corrosion that would not impair serviceability or the valve assemblies.	Minor rust or corrosion that can be removed without affecting the serviceability of the valve assemblies.	Rust, damage, or corrosion that affects serviceability of the valve assemblies.
Nozzles	Free from major damage.	Minor rust or corrosion that can be removed without affecting the serviceability of the nozzles.	Rust, damage, or corrosion that affects serviceability of the nozzles.
Hoses	Free of rips and tears.	Small pinch-like holes.	Major rips or tears.

INSTALLATION INSTRUCTIONS

The TRM can be assembled and set up for operation with no special tools or test equipment.

ASSEMBLE EQUIPMENT

1. Refer to the operator instructions in Chapter 2 of this manual.
2. Place all components of the TRM into position.

PRELIMINARY SERVICING OF EQUIPMENT

Refer to the PMCS procedures in WP 0039 of this manual for instructions on lubricating requirements prior to operating equipment.

END OF WORK PACKAGE

FIELD MAINTENANCE

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION

General, Leakage Definitions, Inspection, Lubrication Service Intervals – Normal Conditions, Lubrication Service Intervals – Unusual Conditions, Cleaning and Lubrication

GENERAL

1. Systematic, periodic Preventive Maintenance Checks and Services (PMCS) are essential to ensure that the TRM is ready for operation at all times. The purpose of a preventive maintenance program is to discover and correct defects and deficiencies before they can cause serious damage or complete failure of the equipment. Any effective preventive maintenance program must begin with the indoctrination of Operators to notify Field Maintenance of all unusual conditions noted during daily checks or actual operation. All defects and deficiencies discovered during maintenance inspections must be recorded, together with corrective action taken, on DA Form 2404, Equipment Inspection and Maintenance Worksheet, or DA Form 5988-E, Equipment Maintenance and Inspection Worksheet. Pay attention to WARNING and CAUTION statements. A WARNING means someone could be injured or killed. A CAUTION means equipment could get damaged.
2. A schedule for Field Maintenance inspection and service should be established immediately after initial operation of the TRM. When operating under unusual conditions, such as a very dusty or sandy environment, it may be necessary to reduce the interval to monthly or even less if conditions are extreme.
3. The TRM has very few requirements for Field Maintenance PMCS. However, the PLS Trailer, PLS and HEMTTs have Field Maintenance PMCS contained in their own separate manuals. Refer to the applicable technical manual for these items for proper Field Maintenance PMCS procedures and perform those procedures.
4. If you find something wrong when performing PMCS, fix it, if you can, using troubleshooting procedures and/or maintenance procedures.
5. The right-hand column of the PMCS table lists conditions that make the equipment not fully mission capable. Use DA Form 2404 or DA Form 5988-E to report items that have not been fixed. For further information on how to use these forms, see DA PAM 750-8.
    a. Perform *Semiannual* PMCS once every 6 months.
    b. Perform *Annual* PMCS once each year.
    c. Perform *Triennial* PMCS once every 3 years.

LEAKAGE DEFINITIONS

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

CAUTION

Equipment operation is allowed with Class I or II leakage. Class III leaks must be reported immediately to Field Maintenance. Failure to comply may cause damage to equipment.

1. When operating with Class I or II leaks, continue to check drip pans and ensure the leak is not a Class III leak.
2. If there is a Class III leak, shut down operation immediately, and report it to Field Maintenance.
3. It is important to understand how fluid leakage affects the status of the TRM. Following are definitions of the leakage classes the Operators and Mechanics need to become familiar with in order to determine the condition of the leak. When in doubt, always consult your supervisor.
4. Leakage Classifications for PMCS:
   a. CLASS I - Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
   b. CLASS II - Leakage of fluid great enough to form drops but not enough to cause drops to drip from Item being inspected.
   c. CLASS III - Leakage of fluid great enough to form drops that fall from the Item being inspected.

INSPECTION

Look for signs of a problem or trouble. You can feel, smell, hear, or see many problems. Be alert when using the equipment.

Inspect to ensure items are in good condition. Ensure that they are properly lubricated, correctly assembled, stowed, secured, and are not excessively worn, leaking, or corroded. Correct any problems found.

The following are common items to check throughout the equipment:

1. Bolts, clamps, nuts, and screws: Tighten loose connectors and look for chipped paint, bare metal, rust, or corrosion around bolts, screw heads, and nuts.
2. Welds: Many Items on the equipment are welded. To check for defective welds, look for chipped paint, rust, corrosion, or gaps.
3. Electrical wires, connectors, and harnesses: Tighten loose connectors. Look for cracked or broken insulation, bare wires, and broken connectors. If any of these conditions exist, repair as required.
4. Hoses and fluid lines: Look for wear, damage, and leaks. Ensure that clamps and fittings are tight. A wet spot indicates leakage. A stain near a fitting or connector can also indicate leakage. If a leak is discovered, repair as required.

LUBRICATION SERVICE INTERVALS – NORMAL CONDITIONS

For safer, more trouble-free operations, make sure that your equipment is serviced as scheduled.

LUBRICATION SERVICE INTERVALS – UNUSUAL CONDITIONS

Your equipment will require extra service and care when you operate under unusual conditions. High or low temperatures and/or long periods of hard use or continued use in sand, water, mud, or snow will break down the lubricant.

CLEANING AND LUBRICATION

WARNING

Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles, Use in well-ventilated areas. Keep away from open flames and other sources of ignition. Failure to comply may cause injury or death to personnel.

The following cleaning and lubrication procedures can aid in preventing equipment problems:

CAUTION

Follow all cleaning and lubrication instructions carefully. Failure to comply could result in damage to equipment.

1. Thoroughly wash all equipment exposed to salt and spray with clean, fresh water.
2. Use solvent cleaning compound, MIL-PRF-680 or equivalent, to clean parts that will be lubricated. Do not use fluid or semi-fluid lubricant on coated surfaces. Wipe surface dry before lubricating.
3. Clean grease fittings before lubrication.
4. Lubricate all equipment before equipment storage.
5. Always use the PMCS lubrication instructions as a guide.
6. Never use too much lubricant.
7. Never use the wrong type or grade of lubricant.
8. Lubricate more during constant use and less during inactive periods.
9. Use the correct grade of lubricant for seasonal temperature expected.

END OF WORK PACKAGE

FIELD MAINTENANCE

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INCLUDING LUBRICATION INSTRUCTIONS

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)

Materials/Parts

Apron, utility (WP 0153, Item 1)
Cleaning compound, solvent (WP 0153, Item 2)
Cloth, cleaning (WP 0153, Item 5)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Grease, automotive and artillery, GAA (WP 0153, Item 8)
Oil, lubricating, OE/HDO-10 (WP 0153, Item 12)
Oil, lubricating, OEA-30 Arctic (WP 0153, Item 13)
Petrolatum, technical (WP 0153, Item 15)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

WP 0002
WP 0004
WP 0021
WP 0050
WP 0054
WP 0069
WP 0076
WP 0081

Equipment Condition

TRM shut down (WP 0022)
TRM drained (WP 0017)
TRM mounted on PLS trailer (WP 0013)

Table 1. Preventive Maintenance Checks and Services (PMCS).

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
				WARNING • Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. • Wet metal surfaces are slippery. Use caution when climbing on tank. Failure to comply could result in injury or death to personnel. • Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge. • Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face. • Failure to comply could result in injury or death to personnel.	
				NOTE Refer to WP 0002 and WP 0004 for location of components.	
1	Semi-annual		Battery	a. Inspect battery box for corrosion and debris.	Corrosion has made holes in battery box.
				b. Clean terminals and coat with petrolatum technical.	Terminals corroded.
				c. Inspect battery cables for frays, splits, and looseness.	Cables frayed, split, or loose.
				d. Check electrolyte level. Service batteries if required (WP 0054).	
2	Semi-annual		Static Ground Reel	Check the continuity of static ground cables from each clip to: 1. Tank 2. Frame	No continuity between cable and frame.
3	Semi-annual		Fuel Pump Assembly	Check fuel strainer for damage and debris (WP 0076).	Fuel strainer is damaged or cannot be cleaned

Table 1. Preventive Maintenance Checks and Services (PMCS) - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
4	Annual		Tank	Visually inspect interior of tank for accumulation of debris or sludge. Refer to WP 0021 for tank cleaning procedures if required.	
5	Annual		Isolation Mounts	a. Inspect isolation mounts for signs of damage or deterioration. b. Torque nuts of isolation mounts to 400 lb-ft (542 Nm) as necessary.	Isolation mounts are damaged or deteriorated.
6	Annual		Compression Springs	Check compression springs for loose or missing hardware (WP 0050).	Compression springs have loose or missing hardware.

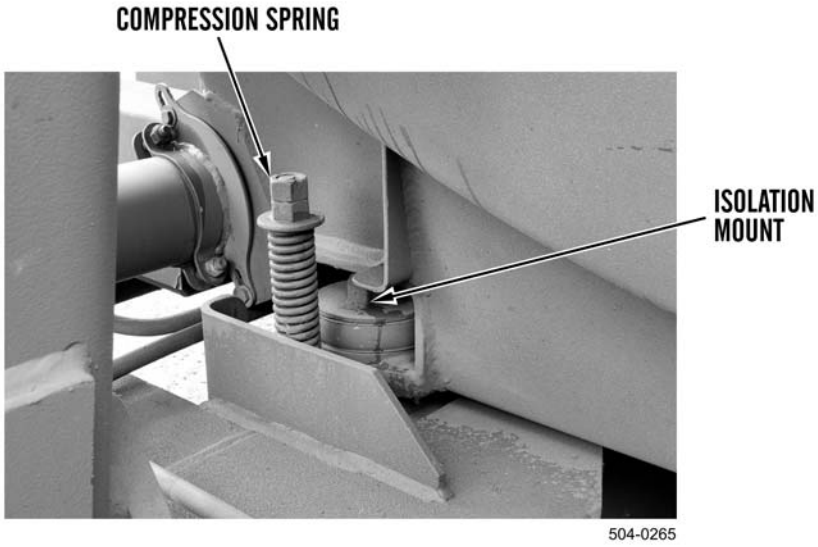


Figure 1. Compression Spring and Isolation Mount.

7	Triennial		Discharge Piping Assembly	Inspect and replace 4 in. coupling assemblies and gaskets per WP 0069.	
8	Triennial		Bottom Load Piping Assembly	Inspect and replace coupling assemblies and gaskets per WP 0081.	

LUBRICATION INSTRUCTIONS

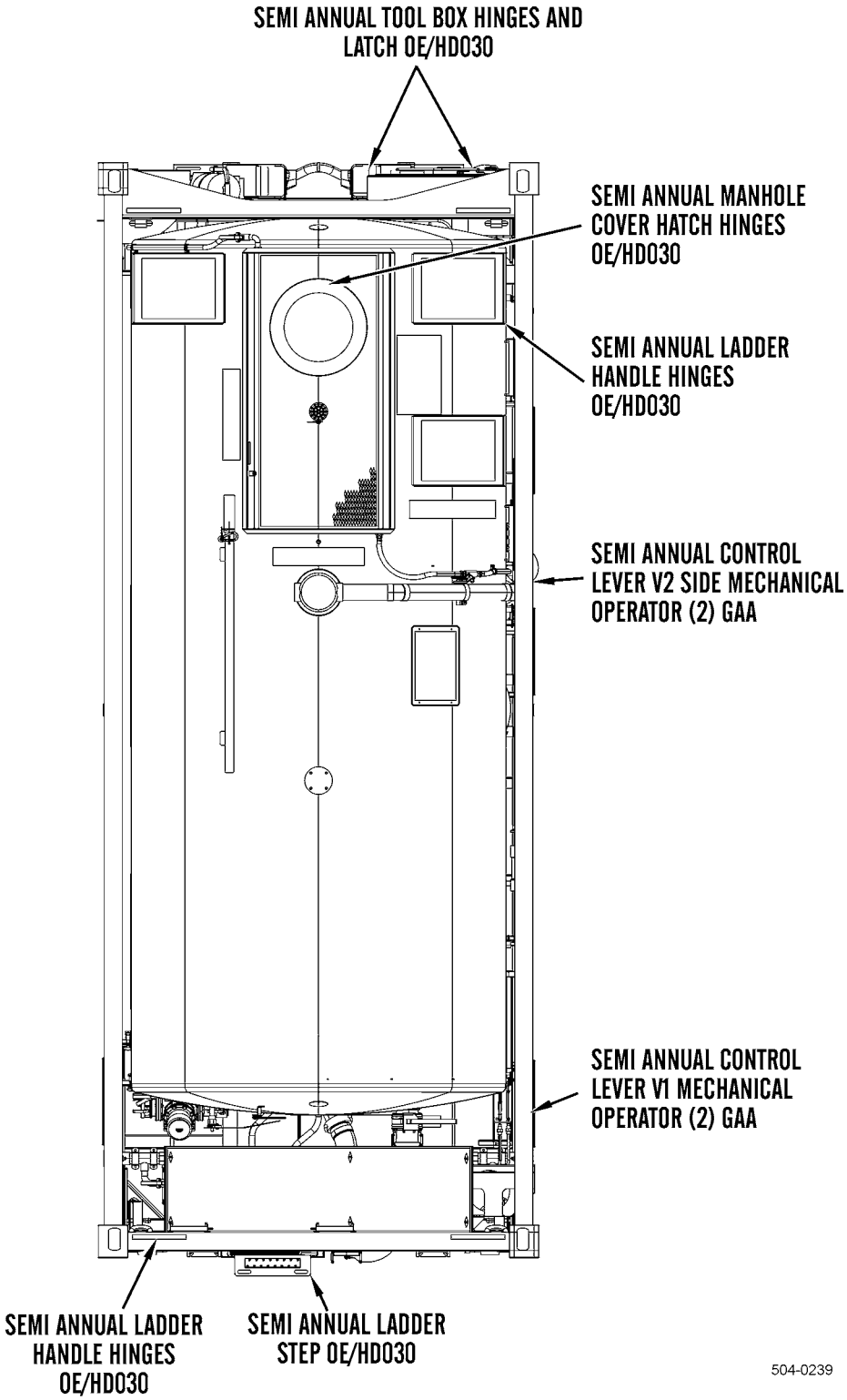

SEMI ANNUAL TOOL BOX HINGES AND LATCH OE/HD030
SEMI ANNUAL MANHOLE COVER HATCH HINGES OE/HD030
SEMI ANNUAL LADDER HANDLE HINGES OE/HD030
SEMI ANNUAL CONTROL LEVER V2 SIDE MECHANICAL OPERATOR (2) GAA
SEMI ANNUAL CONTROL LEVER V1 MECHANICAL OPERATOR (2) GAA
SEMI ANNUAL LADDER HANDLE HINGES OE/HD030
SEMI ANNUAL LADDER STEP OE/HD030
504-0239

Figure 2. Lubrication Points.

LUBRICATION INSTRUCTIONS – CONTINUED

Table 2. Lubrication Table.

LUBRICATION POINTS	CAPACITIES	ABOVE +15 °F (ABOVE -9 °C)	+40 °F TO -15 °F	INTERVAL
Control Lever (V1) Mechanical Operator	As Required	GAA	GAA	Semiannual
Control Lever (V2) Side Mechanical Operator	As Required	GAA	GAA	Semiannual
Tool Box Hinges and Latch	As Required	OE/HDO-30	OE/HD0-10	Semiannual
Manhole Cover Hatch Hinges	As Required	OE/HDO-30	OE/HD0-10	Semiannual
Ladder Handles Hinges	As Required	OE/HDO-30	OE/HD0-10	Semiannual
Ladder Step	As Required	OE/HDO-30	OE-HDO-10	Semiannual

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

MANHOLE COVER REPAIR
Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Respirator, air filtering (WP 0153, Item 16)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0108

Equipment Condition

TRM shut down (WP 0022)

REMOVAL

WARNING

- Goggles, gloves, and respirator must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

REMOVAL – CONTINUED

1. Open manhole cover (Figure 1, Item 3) slowly to relieve pressure.
2. Close manhole cover (Figure 1, Item 3).
3. Remove nut (Figure 1, Item 7), washer (Figure 1, Item 8), and bolt (Figure 1, Item 2) from clamping ring (Figure 1, Item 1).
4. Remove clamping ring (Figure 1, Item 1) from manhole cover (Figure 1, Item 3).
5. Remove manhole cover (Figure 1, Item 3) from tank assembly (Figure 1, Item 6).

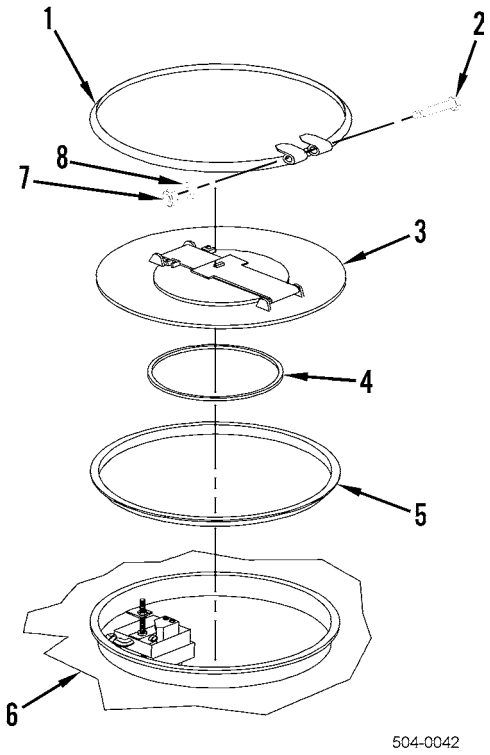


Figure 1. Manhole Cover.

END OF TASK

DISASSEMBLY

1. Open manhole cover latch (Figure 1, Item 3) and remove upper manhole cover preformed packing (Figure 1, Item 4) from manhole cover (Figure 1, Item 3).
2. Remove gasket (Figure 1, Item 5) from manhole cover opening on tank assembly (Figure 1, Item 6).

END OF TASK

ASSEMBLY

WARNING

- Goggles, gloves, and respirator must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

1. Place gasket (Figure 1, Item 5) on manhole cover opening on tank assembly (Figure 1, Item 6).
2. Place upper manhole cover preformed packing (Figure 1, Item 4) on manhole cover (Figure 1, Item 3) with flat side up.

END OF TASK

INSTALLATION

1. Position manhole cover (Figure 1, Item 3) on tank assembly (Figure 1, Item 6).
2. Install clamping ring (Figure 1, Item 1) on manhole cover (Figure 1, Item 3) and tank assembly (Figure 1, Item 6).
3. Install bolt (Figure 1, Item 2), washer (Figure 1, Item 8) and nut (Figure 1, Item 7) on clamping ring (Figure 1, Item 1).

NOTE

When installing manhole cover, it might be necessary to use a rubber mallet to tap manhole cover during tightening of nut.

4. Tighten nut (Figure 1, Item 7) to secure clamping ring (Figure 1, Item 1) to tank assembly (Figure 1, Item 6).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

HOSE TROUGH ASSEMBLY REPAIR
Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Nut, self-locking, hex (WP 0154, Item 18) (4)
Rivet (WP 0154, Item 25) (20)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

WP 0109

Equipment Condition

TRM shut down (WP 0022)
Ladder and brackets removed (WP 0042)
Data plate removed (WP 0051)
Hoses removed

REMOVAL

1. Remove four locknuts (Figure 1, Item 7), bolts (Figure 1, Item 3), and eight washers (Figure 1, Item 4) from hose trough assembly (Figure 1, Item 1). Discard locknuts.
2. Remove two bolts (Figure 1, Item 6) and bracket (Figure 1, Item 5) from rear of TRM frame (Figure 1, Item 2).
3. Remove hose trough assembly (Figure 1, Item 1) from TRM frame (Figure 1, Item 2).

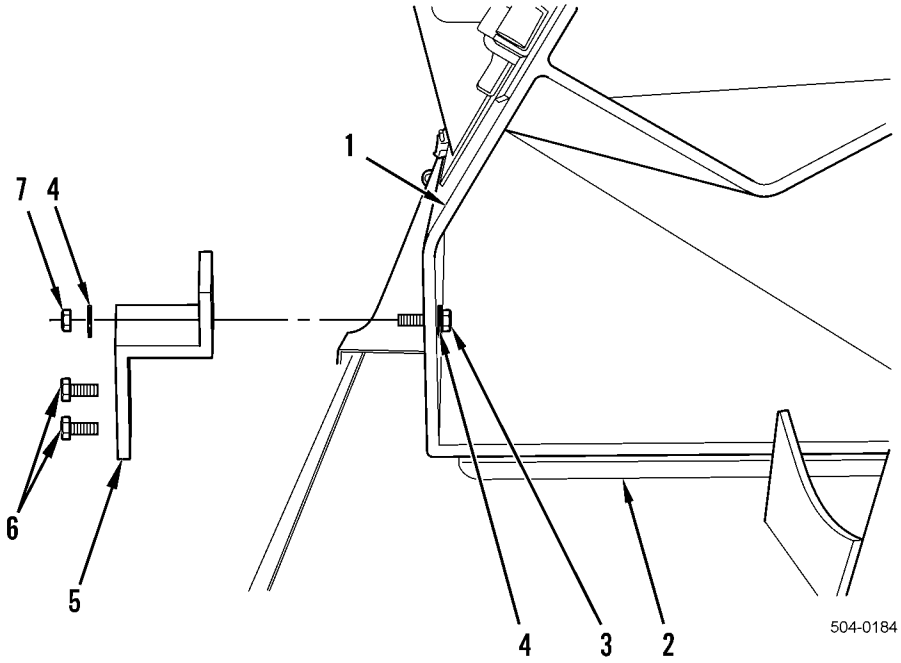


Figure 1. Hose Trough Assembly.

END OF TASK

DISASSEMBLY

NOTE

The procedure for clamping latch and lanyard is similar for the front and rear trough assembly doors. The rear trough assembly door clamping catch is shown in this procedure.

1. Remove eight rivets (Figure 2, Item 13), lanyard (Figure 2, Item 9), and three clamping catches (Figure 2, Item 8) from hose trough assembly (Figure 2, Item 1). Discard rivets.
2. Remove eight rivets (Figure 2, Item 12), lanyard (Figure 2, Item 9), and three clamping catch plates (Figure 2, Item 11) from hose trough assembly door (Figure 2, Item 10). Discard rivets.
3. Remove two rivets (Figure 2, Item 2), lanyard (Figure 2, Item 3), and clamping catch (Figure 2, Item 7) from hose trough assembly (Figure 2, Item 1). Discard rivets.
4. Remove two rivets (Figure 2, Item 4), lanyard (Figure 2, Item 3), and clamping catch plate (Figure 2, Item 5) from hose trough assembly door (Figure 2, Item 6). Discard rivets.

END OF TASK

ASSEMBLY

1. Install clamping catch plate (Figure 2, Item 5), lanyard (Figure 2, Item 3), and two new rivets (Figure 2, Item 4) on hose trough assembly door (Figure 2, Item 6).
2. Install clamping catch (Figure 2, Item 7), lanyard (Figure 2, Item 3), and two new rivets (Figure 2, Item 2) on hose trough assembly (Figure 2, Item 1).

NOTE

The procedure for clamping latch and lanyard is similar for the front and rear trough assembly doors. The rear trough assembly door clamping catch is shown in this procedure.

3. Install three clamping catch plates (Figure 2, Item 11), lanyard (Figure 2, Item 9), and eight new rivets (Figure 2, Item 12) on hose trough assembly door (Figure 2, Item 10).
4. Install three clamping catches (Figure 2, Item 8) lanyard (Figure 2, Item 9), and six new rivets (Figure 2, Item 13) on hose trough assembly (Figure 2, Item 1).

ASSEMBLY – CONTINUED

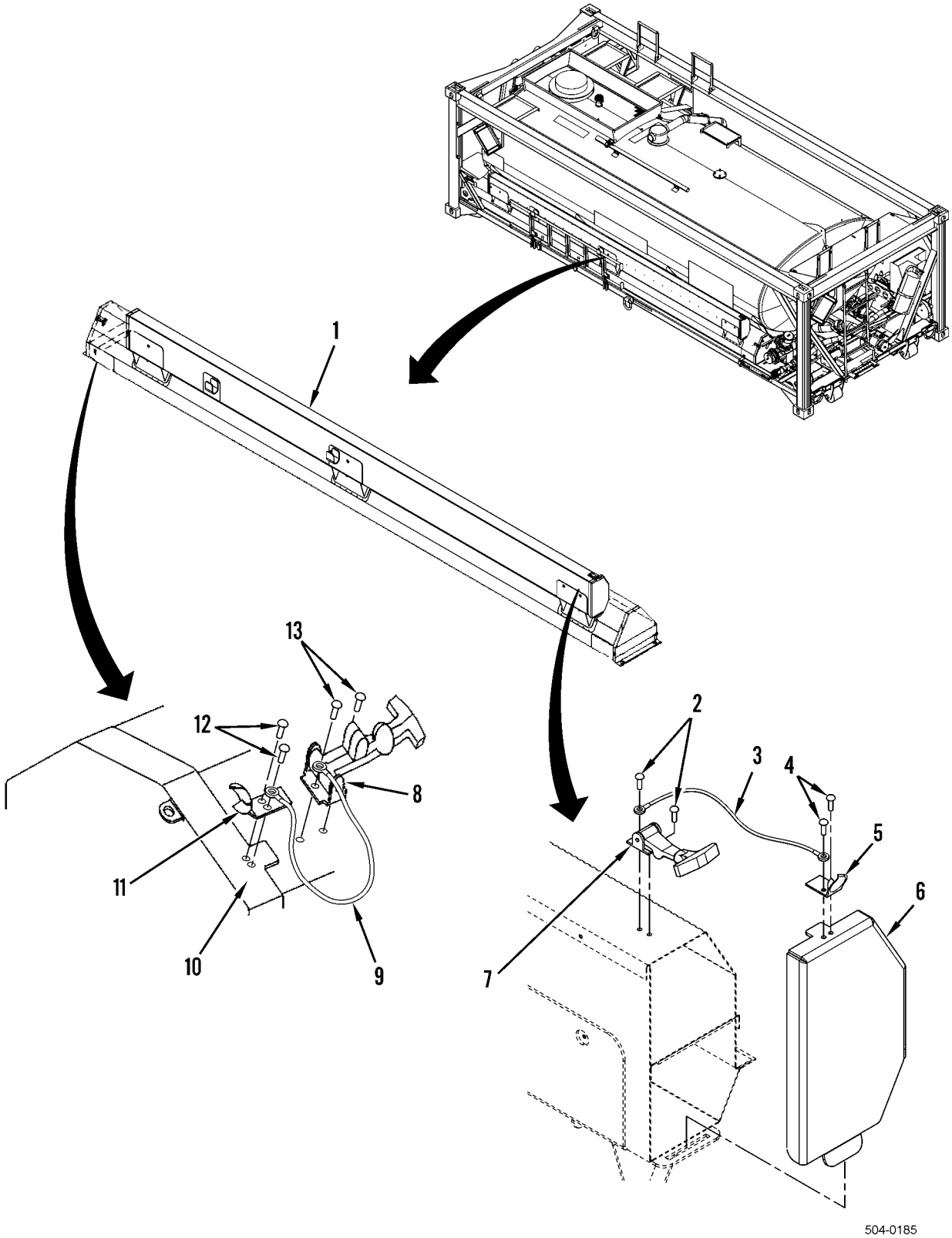


Figure 2. Hose Trough Doors.

END OF TASK

INSTALLATION

1. Install hose trough assembly (Figure 3, Item 1) on TRM frame (Figure 3, Item 2).
2. Install bracket (Figure 3, Item 5) and two bolts (Figure 3, Item 6) to rear of TRM frame (Figure 3, Item 2).
3. Install eight washers (Figure 3, Item 4), four bolts (Figure 3, Item 3), and new locknuts (Figure 3, Item 5) on hose trough assembly (Figure 3, Item 1).

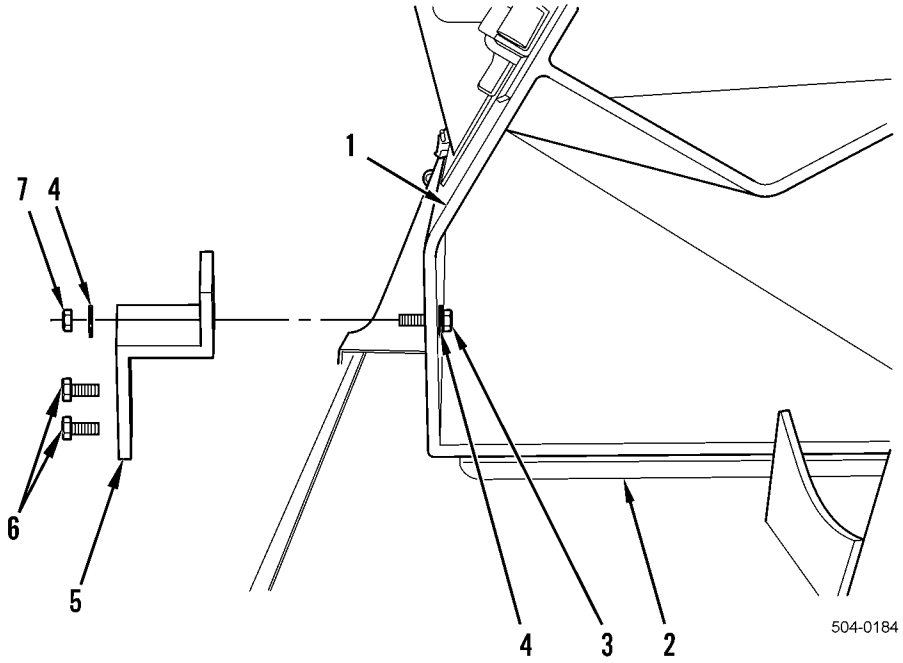


Figure 3. Hose Trough Assembly.

4. Install ladder and brackets (WP 0042).
5. Install data plate (WP 0051).
6. Install hoses.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

LADDER AND BRACKETS REPLACEMENT
Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Washer, lock (WP 0154, Item 35) (8)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0109
WP 0110

Equipment Condition

TRM shut down (WP 0022)

REMOVAL

1. Release two clamping catches (Figure 1, Item 1) and remove ladder (Figure 1, Item 2) from brackets (Figure 1, Item 3).

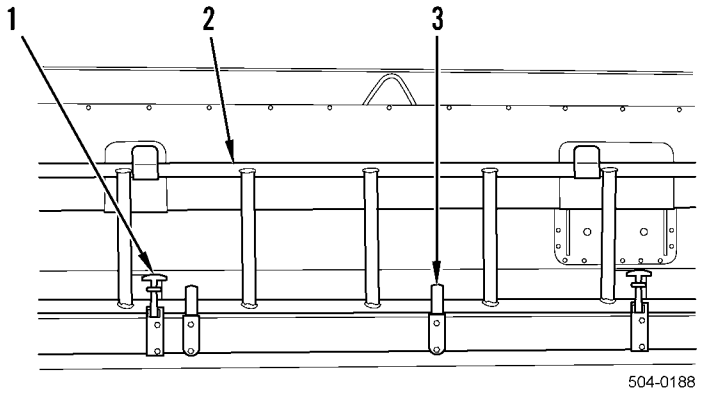


Figure 1. Ladder.

REMOVAL – CONTINUED

2. Remove four screws (Figure 2, Item 4), nuts (Figure 2, Item 1), lockwashers (Figure 2, Item 2), and two clamping catches (Figure 2, Item 3) from brackets (Figure 2, Item 5). Discard lockwashers.

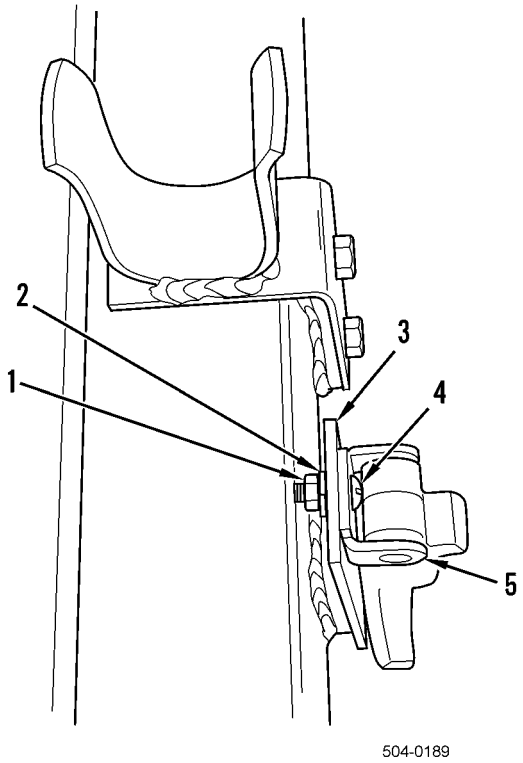


Figure 2. Ladder Clamping Catch.

3. Remove four bolts (Figure 3, Item 2) and two clamping catch brackets (Figure 3, Item 3) from TRM frame (Figure 3, Item 1).
4. Remove four bolts (Figure 3, Item 5) and two brackets (Figure 3, Item 4) from TRM frame (Figure 3, Item 1).

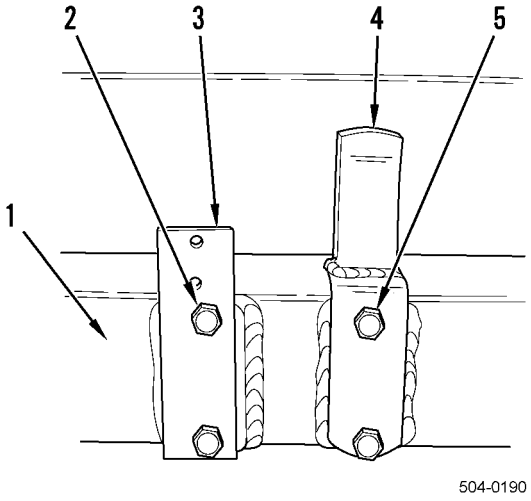


Figure 3. Ladder Brackets.

END OF TASK

DISASSEMBLY

Remove four screws (Figure 4, Item 3), nuts (Figure 4, Item 1), lockwashers (Figure 4, Item 2), and two clamping catch plates (Figure 4, Item 4) from ladder (Figure 4, Item 5). Discard lockwashers.

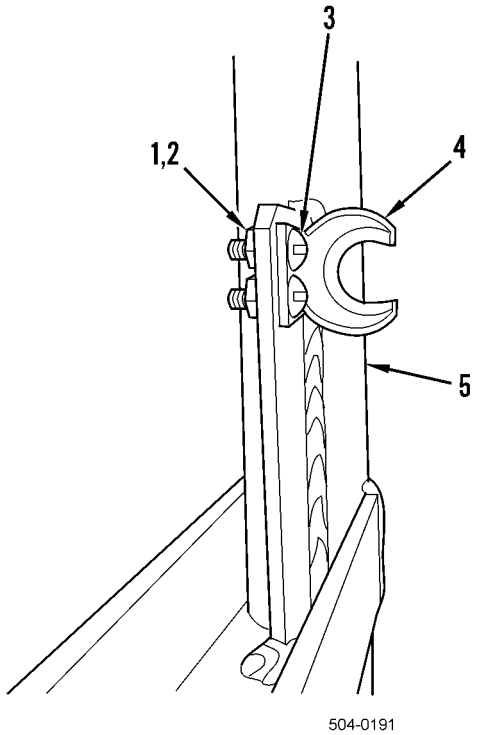


Figure 4. Ladder Clamping Catch Plates

END OF TASK

ASSEMBLY

Install two clamping catch plates (Figure 4, Item 4), four new lockwashers (Figure 4, Item 2), screws (Figure 4, Item 3), and nuts (Figure 4, Item 1) on ladder (Figure 4, Item 5).

END OF TASK

INSTALLATION

1. Install two brackets (Figure 3, Item 4) and four bolts (Figure 3, Item 5) on TRM frame (Figure 3, Item 1).
2. Install two clamping catch brackets (Figure 3, Item 3) and four bolts (Figure 3, Item 2) on TRM frame (Figure 3, Item 1).
3. Install two clamping catches (Figure 2, Item 3), four new lockwashers (Figure 2, Item 2), screws (Figure 2, Item 4), and nuts (Figure 2, Item 1) on brackets (Figure 2, Item 5).

INSTALLATION – CONTINUED

4. Install ladder (Figure 5, Item 2) on brackets (Figure 5, Item 3) and secure with two clamping catches (Figure 5, Item 1).

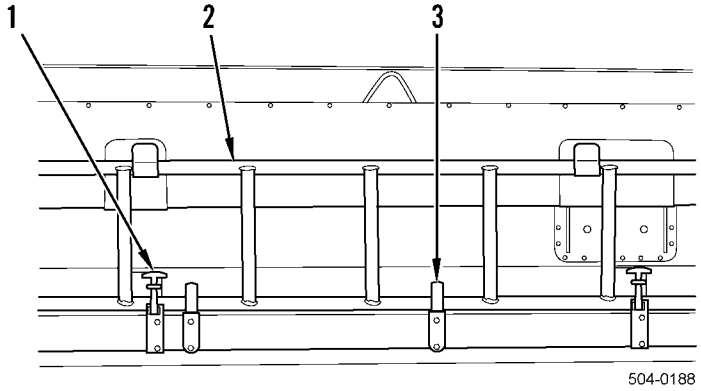


Figure 5. Ladder.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

ISO RACK LADDERS REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Nut, self-locking, hex (WP 0154, Item 18) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0110

Equipment Condition

TRM shut down (WP 0022)

REMOVAL

1. Remove two locknuts (Figure 1, Item 3), four washers (Figure 1, Item 2), and two bolts (Figure 1, Item 4) securing ISO rack ladder (Figure 1, Item 5) to TRM frame (Figure 1, Item 1). Discard locknuts.
2. Lift ISO rack ladder (Figure 1, Item 5) upwards until bottom of ISO rack ladder (Figure 1, Item 5) is removed.

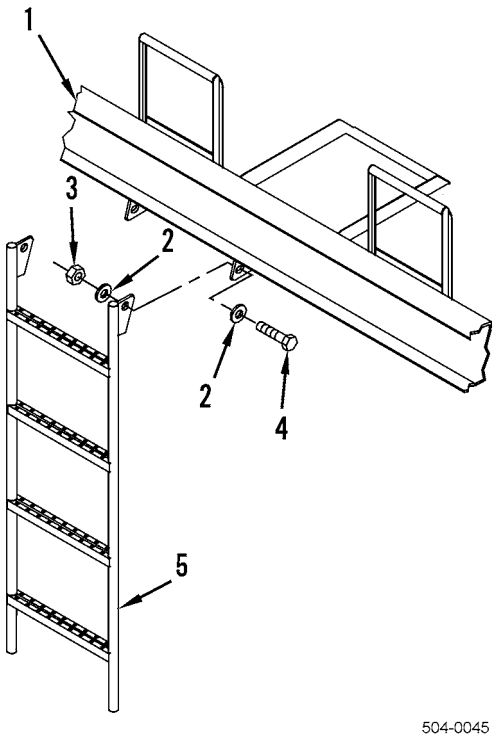


Figure 1. ISO Rack Ladders.

END OF TASK

INSTALLATION

1. Install ISO rack ladder (Figure 2, Item 5) in mounting rings on bottom of TRM frame (Figure 2, Item 1).
2. Lift upwards on ISO rack ladder (Figure 2, Item 5) to align holes in ISO rack ladder (Figure 2, Item 5) and upper TRM frame (Figure 2, Item 1).
3. Install two bolts (Figure 2, Item 4) four washers (Figure 2, Item 2), and two new locknuts (Figure 2, Item 3) through ISO rack ladder (Figure 2, Item 5) and upper TRM frame (Figure 2, Item 1).

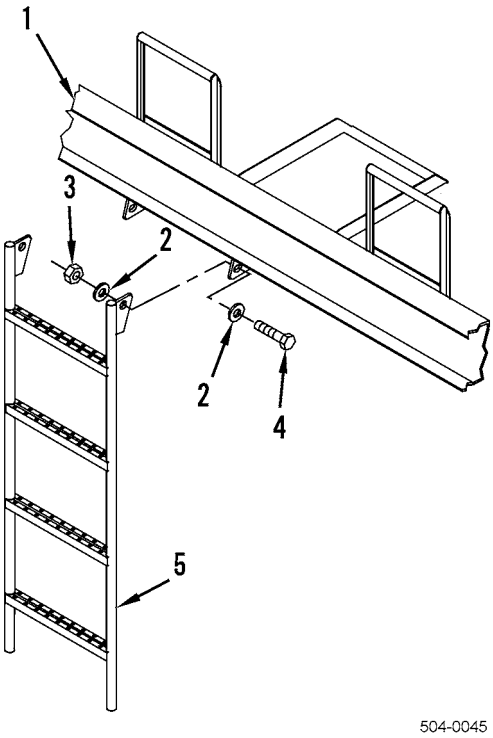


Figure 2. ISO Rack Ladders.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

ISO RACK HANDLES REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Nut, self-locking, hex (WP 0154, Item 16) (4)
Nut, self-locking, hex (WP 0154, Item 18) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0111

Equipment Condition

TRM shut down (WP 0022)

REMOVAL

Rear Handles

WARNING

Handle is under spring tension. Use care during removal. Failure to follow this warning may result in injury to personnel.

1. Remove two locknuts (Figure 1, Item 1), washers (Figure 1, Item 2), and spring (Figure 1, Item 11) from ISO rack handle (Figure 1, Item 3). Discard locknuts.
2. Remove two locknuts (Figure 1, Item 9), washers (Figure 1, Item 10), spring (Figure 1, Item 11), and bolt (Figure 1, Item 8) securing spring to TRM frame (Figure 1, Item 7). Discard locknuts.
3. Remove two locknuts (Figure 1, Item 4), four washers (Figure 1, Items 5), and two screws (Figure 1, Item 6) securing ISO rack handle (Figure 1, Item 3) to TRM frame (Figure 1, Item 7). Discard locknuts.
4. Remove ISO rack handle (Figure 1, Item 3) from TRM frame (Figure 1, Item 7).

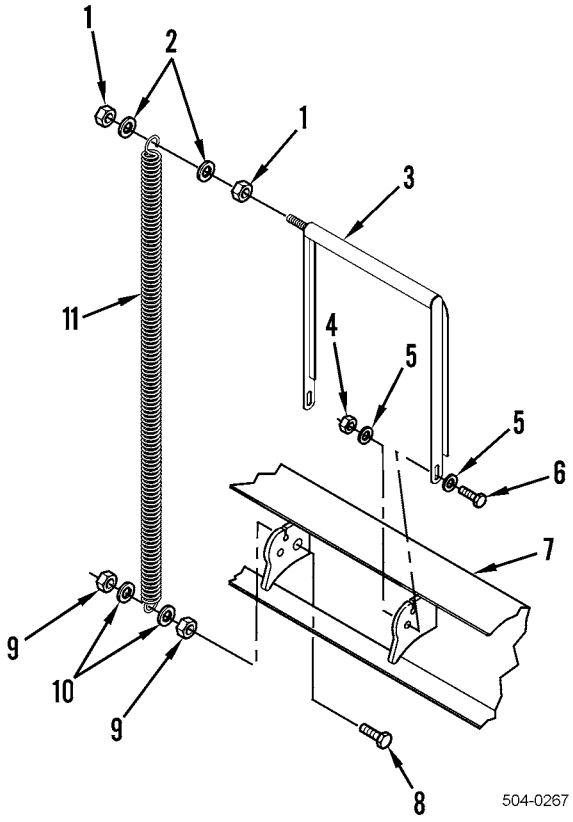


Figure 1. Rear ISO Rack Handles.

Side Handles

WARNING

Handle is under spring tension. Use care during removal. Failure to follow this warning may result in injury to personnel.

1. Remove two locknuts (Figure 2, Item 1), washers (Figure 2, Item 2), and spring (Figure 2, Item 14) from ISO rack handle (Figure 2, Item 3). Discard locknuts.

REMOVAL – CONTINUED

2. Remove two locknuts (Figure 2, Item 12), washers (Figure 2, Item 13), and spring (Figure 2, Item 14) from plate (Figure 2, Item 10) on TRM frame (Figure 2, Item 7). Discard locknuts.

NOTE

Note position and orientation of spring plates for installation.

3. Remove two locknuts (Figure 2, Item 4), four washers (Figure 2, Items 5), and two screws (Figure 2, Item 6) securing ISO rack handle (Figure 2, Item 3) to TRM frame (Figure 2, Item 7). Discard locknuts.
4. Remove ISO rack handle (Figure 2, Item 3) from frame (Figure 2, Item 7).
5. Remove two locknuts (Figure 2, Item 11), two plates (Figure 2, Items 9 and 10), and two screws (Figure 2, Item 8) from TRM frame (Figure 2, Item 7). Discard locknuts.

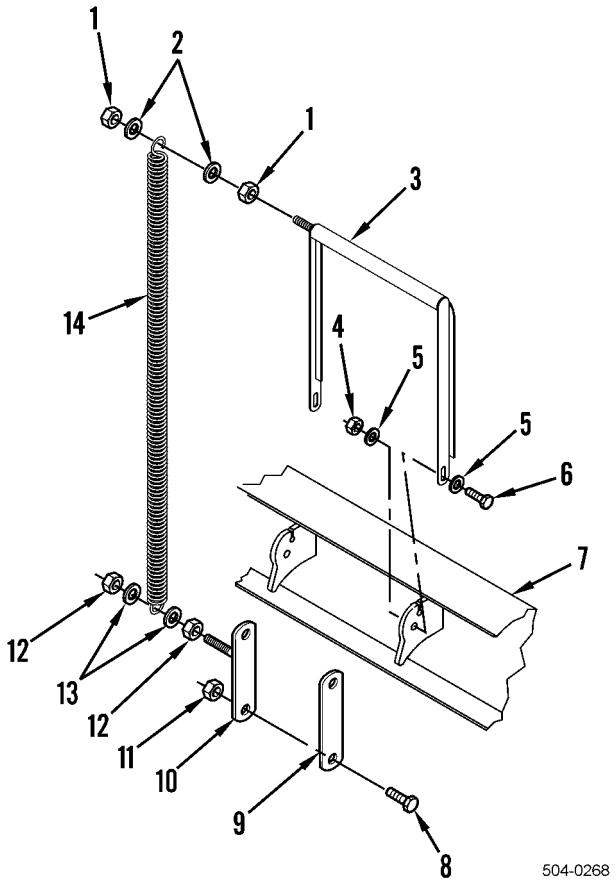


Figure 2. Side ISO Rack Handles.

END OF TASK

INSTALLATION

Rear Handles

1. Position ISO rack handle (Figure 3, Item 3) to TRM frame (Figure 3, Item 7).
2. Install two screws (Figure 3, Item 6), four washers (Figure 3, Item 5), and two new locknuts (Figure 3, Item 4) through ISO rack handle (Figure 3, Item 3) and TRM frame (Figure 3, Item 7).
3. Tighten locknut (Figure 3, Item 4) and back off ½ turn.
4. Install screw (Figure 3, Item 8) through TRM frame (Figure 3, Item 7) and secure with new locknut (Figure 3, Item 9). Tighten locknut.
5. Install two washers (Figure 3, Item 10), spring (Figure 3, Item 11), and new locknut (Figure 3, Item 9) to screw (Figure 3, Item 8).
6. Tighten locknut (Figure 3, Item 9) until washers (Figure 3, Item 10) make contact with spring (Figure 3, Item 11).
7. Install two washers (Figure 3, Item 1), spring (Figure 3, Item 11), and new locknut (Figure 3, Item 1) to ISO rack handle (Figure 3, Item 3).
8. Tighten locknut (Figure 3, Item 1) until washers (Figure 3, Item 2) make contact with spring (Figure 3, Item 9).

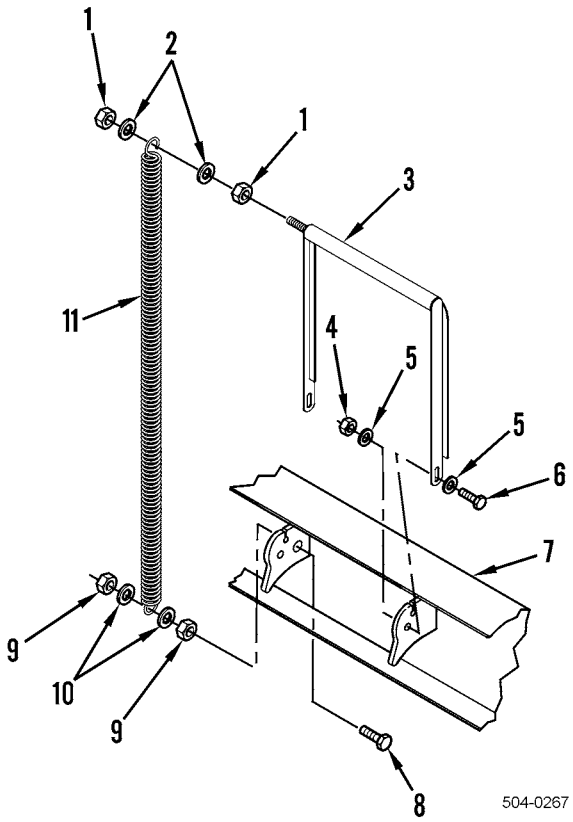


Figure 3. Rear ISO Rack Handles.

INSTALLATION – CONTINUED

Side Handles

1. Install two plates (Figure 4, Items 9 and 10) on TRM frame (Figure 4, Item 7) and secure with two screws (Figure 4, Item 8) and two new locknuts (Figure 4, Item 11). Tighten locknuts.
2. Position ISO rack handle (Figure 4, Item 3) to TRM frame (Figure 4, Item 7).
3. Install two screws (Figure 4, Item 6), four washers (Figure 4, Item 5), and two new locknuts (Figure 4, Item 4) through ISO rack handle (Figure 4, Item 3) and TRM frame (Figure 4, Item 7).
4. Tighten locknuts (Figure 4, Item 4) and back off ½ turn.
5. Install two new locknuts (Figure 4, Item 12), two washers (Figure 4, Item 13), and spring (Figure 4, Item 14) on plate (Figure 4, Item 10).
6. Tighten locknut (Figure 4, Item 12) until washers (Figure 4, Item 13) make contact with spring (Figure 4, Item 14).
7. Install two new locknuts (Figure 4, Item 1), two washers (Figure 4, Item 2), and spring (Figure 4, Item 14) on ISO rack handle (Figure 4, Item 3).
8. Tighten locknut (Figure 4, Item 1) until washers (Figure 4, Item 2) make contact with spring (Figure 4, Item 14).

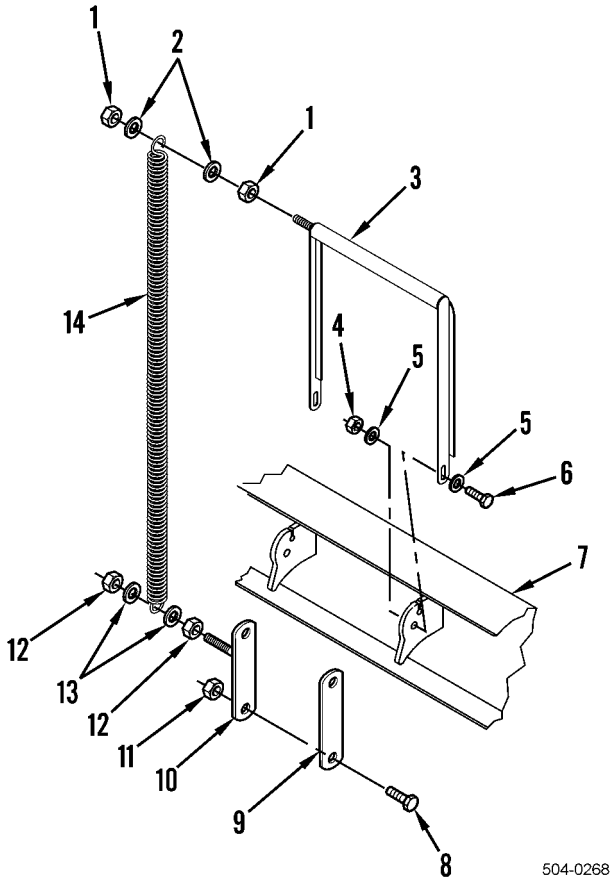


Figure 4. Side ISO Rack Handles.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

ISO RACK PLACARDS REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Nut, lock, hex (WP 0154, Item 11) (6)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0112

Equipment Condition

TRM shut down (WP 0022)

REMOVAL

NOTE

- There are three ISO rack placards located on TRM frame, each consisting of four screws, washers and locknuts.
- A fourth ISO rack placard is located on front of tool box, consisting of two screws, washers, and locknuts, mounted through top and bottom holes in ISO rack placard. To replace this placard, perform Removal step 3 and Installation step 3.

1. Remove four screws (Figure 1, Item 2), washers (Figure 1, Item 3), and locknuts (Figure 1, Item 4) securing ISO rack placard (Figure 1, Item 1) to ISO rack placard mount (Figure 1, Item 5). Discard locknuts.
2. Remove ISO rack placard (Figure 1, Item 1) from ISO rack placard mount (Figure 1, Item 5).

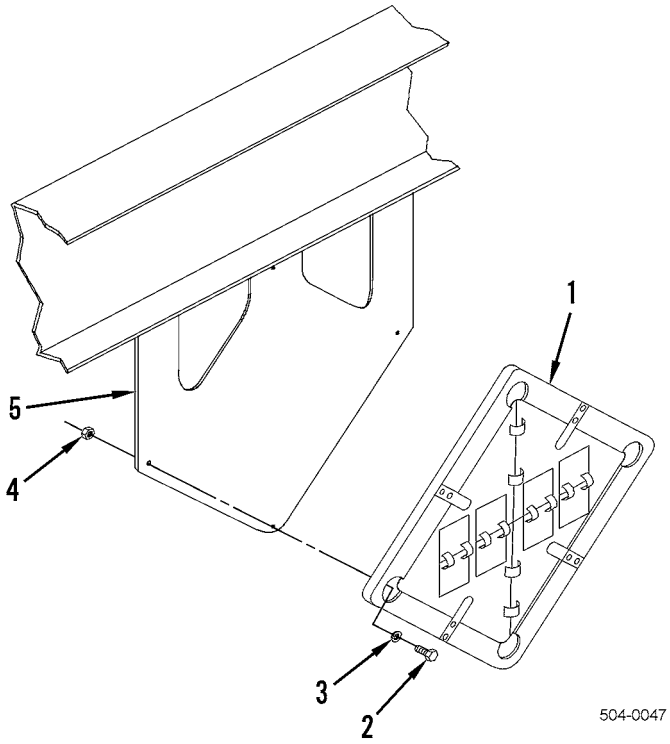


Figure 1. ISO Rack Placards.

3. Remove ISO rack placard from tool box door.
   a. Remove two locknuts (Figure 2, Item 4), washers (Figure 2, Item 3), and screws (Figure 2, Item 2) securing ISO rack placard (Figure 2, Item 1) to tool box door (Figure 2, Item 5). Discard locknuts.
   b. Remove ISO rack placard (Figure 2, Item 1) from tool box door (Figure 2, Item 5).

REMOVAL – CONTINUED

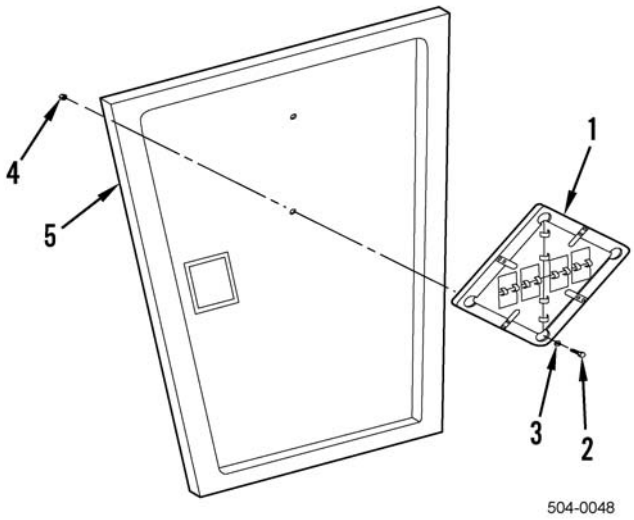


Figure 2. ISO Rack Placards.

END OF TASK

INSTALLATION

1. Position ISO rack placard (Figure 1, Item 1) on ISO rack placard mount (Figure 1, Item 5).
2. Install four screws (Figure 1, Item 2) washers (Figure 1, Item 3), and new locknuts (Figure 1, Item 4) securing ISO rack placard (Figure 1, Item 1) to ISO rack placard mount (Figure 1, Item 5).
3. Install ISO rack placard on tool box door.
   a. Position ISO rack placard (Figure 2, Item 1) on tool box door (Figure 2, Item 5).
   b. Install two screws (Figure 2, Item 2), washers (Figure 2, Item 3), and new locknuts (Figure 2, Item 4) securing ISO rack placard (Figure 2, Item 1) to tool box door (Figure 2, Item 5).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

TOOL BOX REPAIR
Removal, Repair, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)
Splice compression tool (WP 0151, Item 4)

Materials/Parts

Goggles, industrial (WP 0153, Item 7)
Nut, self-locking, hex (WP 0154, Item 18) (6)
Rivet, blind (WP 0154, Item 26) (18)
Sleeve stop (WP 0154, Item 31) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

WP 0113

Equipment Condition

TRM shut down (WP 0022)
Tool box empty
ISO rack placard removed (WP 0047)

REMOVAL

1. Remove 6 locknuts (Figure 1, Item 1), screws (Figure 1, Item 5) and 12 washers (Figure 1, Item 2) securing tool box (Figure 1, Item 4) to TRM frame (Figure 1, Item 3). Discard locknuts.
2. Remove tool box (Figure 1, Item 4) from TRM frame (Figure 1, Item 3).

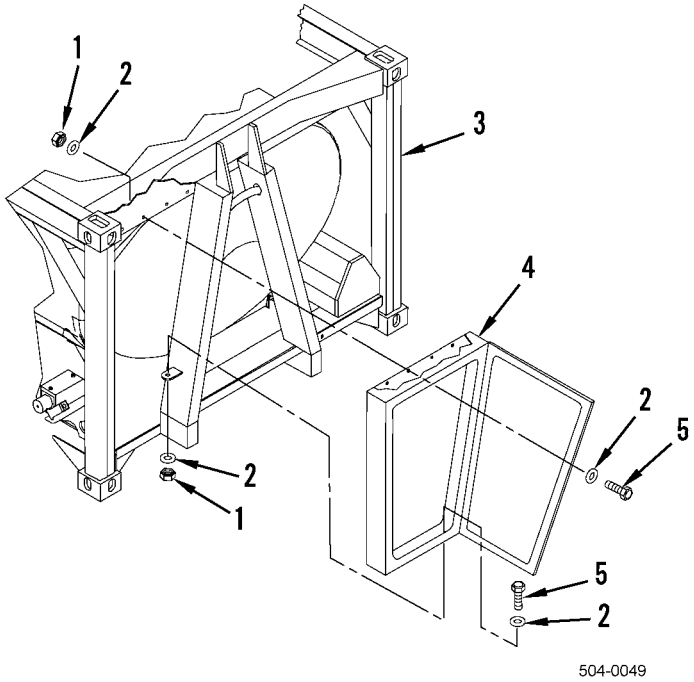


Figure 1. Tool Box.

END OF TASK

REPAIR

WARNING

Wear goggles to prevent foreign objects from entering your eyes. Failure to comply could result in an eye injury.

1. Remove seal (Figure 2, Item 5) from tool box (Figure 2, Item 1).
2. Disassemble door stop cable (Figure 2, Item 7).
   a. Remove two stop sleeves (Figure 2, Item 6) securing door stop cable (Figure 2, Item 7) to tool box (Figure 2, Item 1) and tool box door (Figure 2, Item 4). Discard stop sleeves.
   b. Remove door stop cable (Figure 2, Item 7) from tool box (Figure 2, Item 1) and tool box door (Figure 2, Item 4).
3. Disassemble strike or striker frame (Figure 2, Items 10 and 11).
   a. Remove two screws (Figure 2, Item 12) and two locknuts (Figure 2, Item 9) securing strike (Figure 2, Item 11) to door striker frame (Figure 2, Item 10). Discard locknuts.
   b. Remove strike (Figure 2, Item 11).
   c. Remove two screws (Figure 2, Item 13) and locknuts (Figure 2, Item 8) securing door striker frame (Figure 2, Item 10) to tool box (Figure 2, Item 1). Discard locknuts.
   d. Remove door striker frame (Figure 2, Item 10) from tool box (Figure 2, Item 1).
4. Disassemble door hinges (Figure 2, Item 2) and tool box door (Figure 2, Item 4).
   a. Using drill and twist drill, remove nine rivets (Figure 2, Item 3) securing tool box door (Figure 2, Item 4) to tool box (Figure 2, Item 1). Discard rivets.
   b. Remove tool box door (Figure 2, Item 4) with hinges (Figure 2, Item 2) from tool box (Figure 2, Item 1).
   c. Using drill and twist drill, remove nine rivets (Figure 2, Item 3) securing hinges (Figure 2, Item 2) to tool box door (Figure 2, Item 4). Discard rivets.
   d. Remove hinges (Figure 2, Item 2) from tool box door (Figure 2, Item 4).
5. Assemble door hinge (Figure 2, Item 2).
   a. Using rivet kit, install nine new rivets (Figure 2, Item 3) to secure hinge (Figure 2, Item 2) to tool box door (Figure 2, Item 4).
   b. Using rivet kit, install nine new rivets (Figure 2, Item 3) to secure door (Figure 2, Item 4) to tool box (Figure 2, Item 1).
6. Assemble strike and striker frame (Figure 2, Items 10 and 11).
   a. Install door striker frame (Figure 2, Item 10) to tool box (Figure 2, Item 1).
   b. Install two screws (Figure 2, Item 13) and new locknuts (Figure 2, Item 8) to secure door striker frame (Figure 2, Item 10) to tool box (Figure 2, Item 1).
   c. Install strike (Figure 2, Item 11).
   d. Install two screws (Figure 2, Item 12) and new locknuts (Figure 2, Item 9) to secure strike (Figure 2, Item 11) to door striker frame (Figure 2, Item 10).
7. Assemble door stop cable (Figure 2, Item 7).
   a. Install cable (Figure 2, Item 7) through bottom of tool box (Figure 2, Item 1) and tool box door (Figure 2, Item 4).
   b. Install two new stop sleeves (Figure 2, Item 6) on cable (Figure 2, Item 7) and crimp tightly.

REPAIR – CONTINUED

8. Install seal (Figure 2, Item 5) on tool box (Figure 2, Item 1).

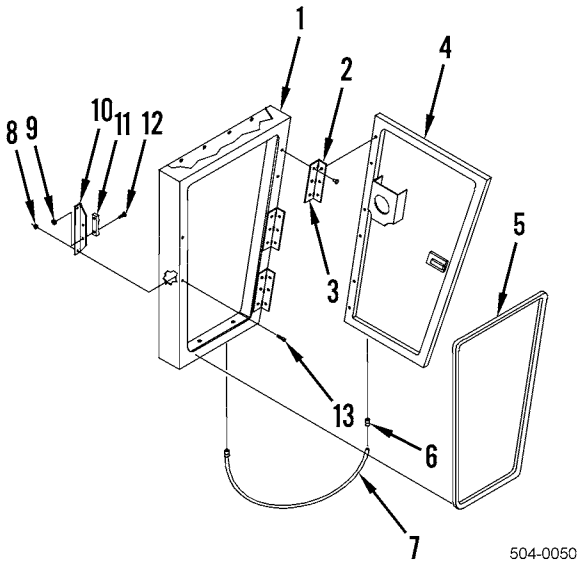


Figure 2. Tool Box.

END OF TASK

INSTALLATION

1. Position tool box (Figure 3, Item 4) on TRM (Figure 3, Item 3).
2. Install 6 screws (Figure 3, Item 5), 12 washers (Figure 3, Item 2), and 6 new locknuts (Figure 3, Item 1) on tool box (Figure 3, Item 4).
3. Tighten six locknuts (Figure 3, Item 1) to secure tool box (Figure 3, Item 4) on TRM (Figure 3, Item 3).

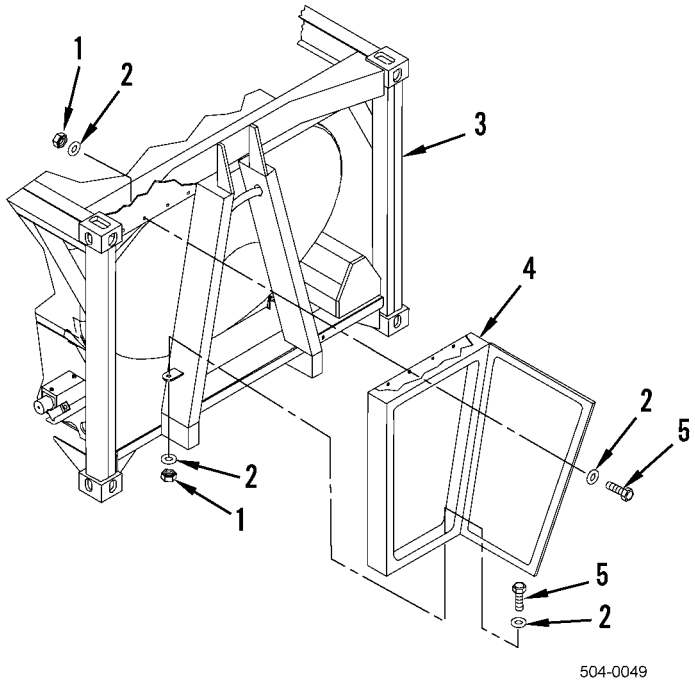


Figure 3. Tool Box.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

STATIC GROUND REELS REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Washer, lock (WP 0154, Item 36) (8)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0114

Equipment Condition

TRM shut down (WP 0022)

REMOVAL

1. Remove two screws (Figure 1, Item 2) and lockwashers (Figure 1, Item 3) securing static ground reel (Figure 1, Item 1) to TRM frame (Figure 1, Item 5). Discard lockwashers.
2. Remove ground reel (Figure 1, Item 1) from TRM frame (Figure 1, Item 5).
3. Remove two lockwashers (Figure 1, Item 4) from TRM frame (Figure 1, Item 5). Discard lockwashers.

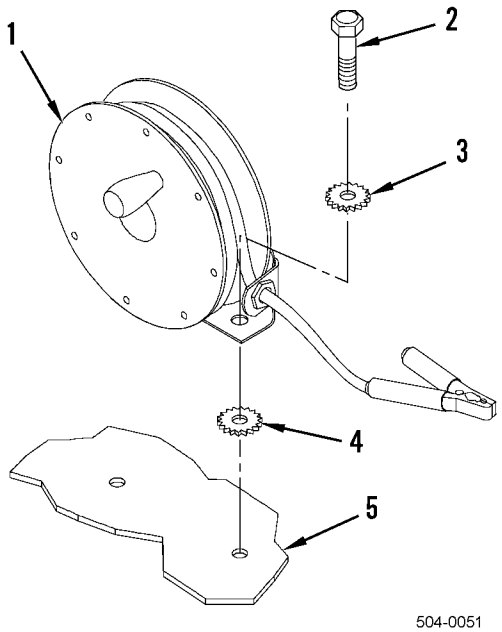


Figure 1. Static Ground Reels.

END OF TASK

INSTALLATION

1. Position two new lockwashers (Figure 2, Item 4) over holes in TRM frame (Figure 2, Item 5).
2. Install ground reel (Figure 2, Item 1) on top of two new lockwashers (Figure 2, Item 4) and TRM frame (Figure 2, Item 5).
3. Install two screws (Figure 2, Item 2) and new lockwashers (Figure 2, Item 3) to fasten ground reel (Figure 2, Item 1) to TRM frame (Figure 2, Item 5).

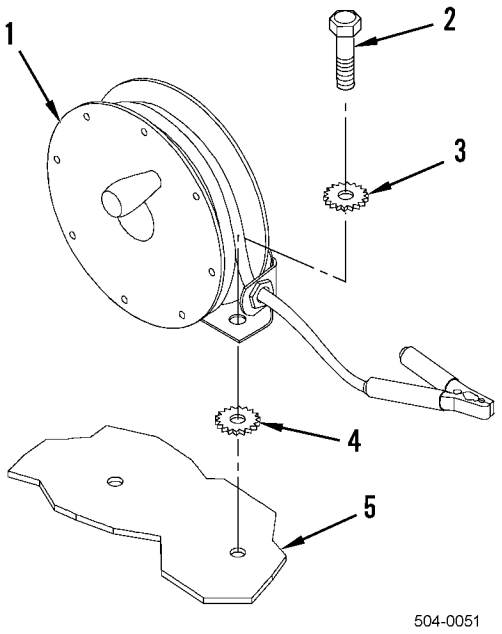


Figure 2. Static Ground Reels.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

GROUND ROD REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

References

WP 0115

Materials/Parts

Washer, lock (WP 0154, Item 35) (8)

Equipment Condition

TRM shut down (WP 0022)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

REMOVAL

1. Unlatch two clamping catches (Figure 1, Item 4) from clamping catch plates (Figure 1, Item 9).
2. Remove ground rod (Figure 1, Item 1) with slide hammer (Figure 1, Item 2) from TRM frame (Figure 1, Item 11).

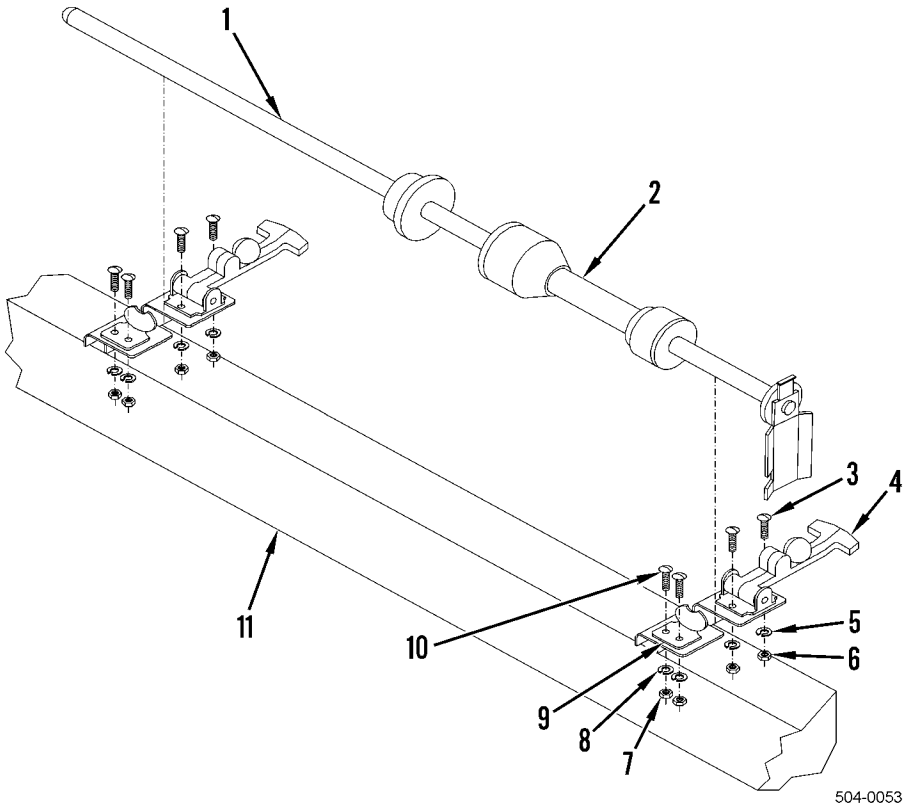


Figure 1. Ground Rod.

REMOVAL – CONTINUED

3. Remove clamping catch.
   a. Remove two nuts (Figure 2, Item 6), lockwashers (Figure 2, Item 5), and screws (Figure 2, Item 3) securing clamping catch (Figure 2, Item 4) to TRM frame (Figure 2, Item 11). Discard lockwashers.
   b. Remove clamping catch (Figure 2, Item 4) from TRM frame (Figure 2, Item 11).
4. Remove clamping catch plate.
   a. Remove two nuts (Figure 2, Item 7), lockwashers (Figure 2, Item 8), and screws (Figure 2, Item 10) securing clamping catch plate (Figure 2, Item 9) to TRM frame (Figure 2, Item 11). Discard lockwashers.
   b. Remove clamping catch plate (Figure 2, Item 9) from TRM frame (Figure 2, Item 11).

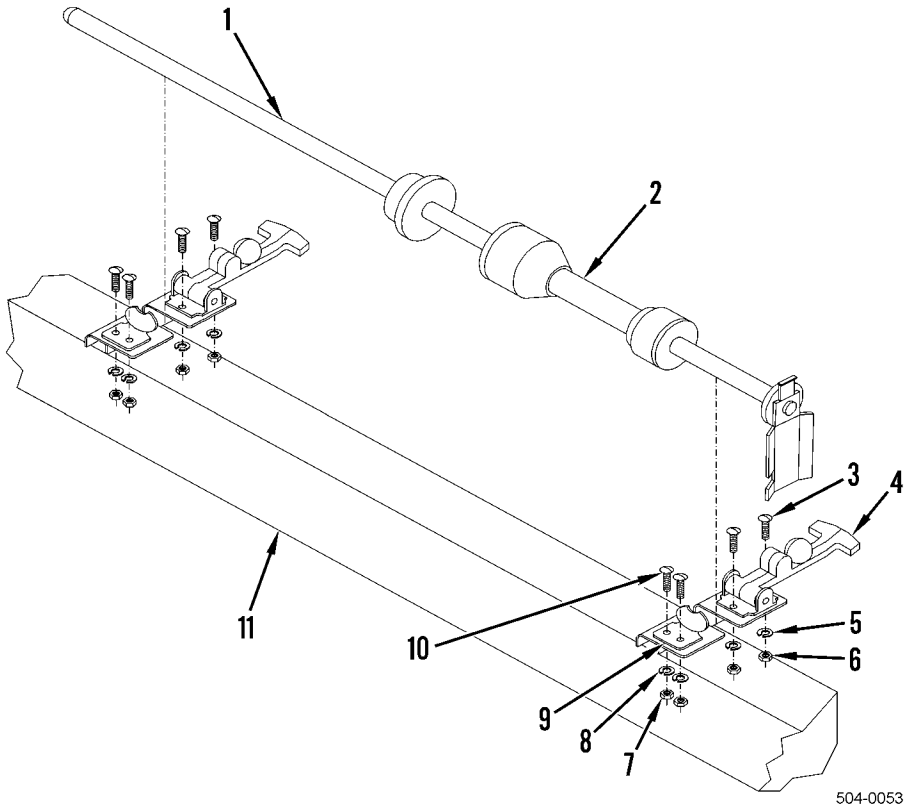


Figure 2. Ground Rod.

END OF TASK

INSTALLATION

1. Install clamping catch plate.
   a. Position clamping catch plate (Figure 2, Item 9) onto TRM frame (Figure 2, Item 11).
   b. Install two screws (Figure 2, Item 10), new lockwashers (Figure 2, Item 8), and nuts (Figure 2, Item 7) securing clamping catch plate (Figure 2, Item 9) to TRM frame (Figure 2, Item 11).
2. Install clamping catch.
   a. Position clamping catch (Figure 2, Item 4) onto TRM frame (Figure 2, Item 11).
   b. Install two screws (Figure 2, Item 3), new lockwashers (Figure 2, Item 5), and nuts (Figure 2, Item 6) securing clamping catch (Figure 2, Item 4) to the TRM frame (Figure 2, Item 11).
3. Position ground rod (Figure 2, Item 1) with slide hammer (Figure 2, Item 2) on TRM frame (Figure 2, Item 11) and secure with clamping catches (Figure 2, Item 4).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

TANK GROUND STRAP REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Nut, self-locking, hex (WP 0154, Item 18) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

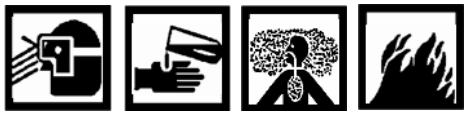
WP 0115

Equipment Condition

TRM shut down (WP 0022)

REMOVAL

WARNING



Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Remove bolt (Figure 1, Item 1), locknut (Figure 1, Item 2) and ground strap (Figure 1, Item 3) from tank. Discard locknut.
2. Remove bolt (Figure 1, Item 5), locknut (Figure 1, Item 4) and ground strap (Figure 1, Item 3) from tank. Discard locknut.

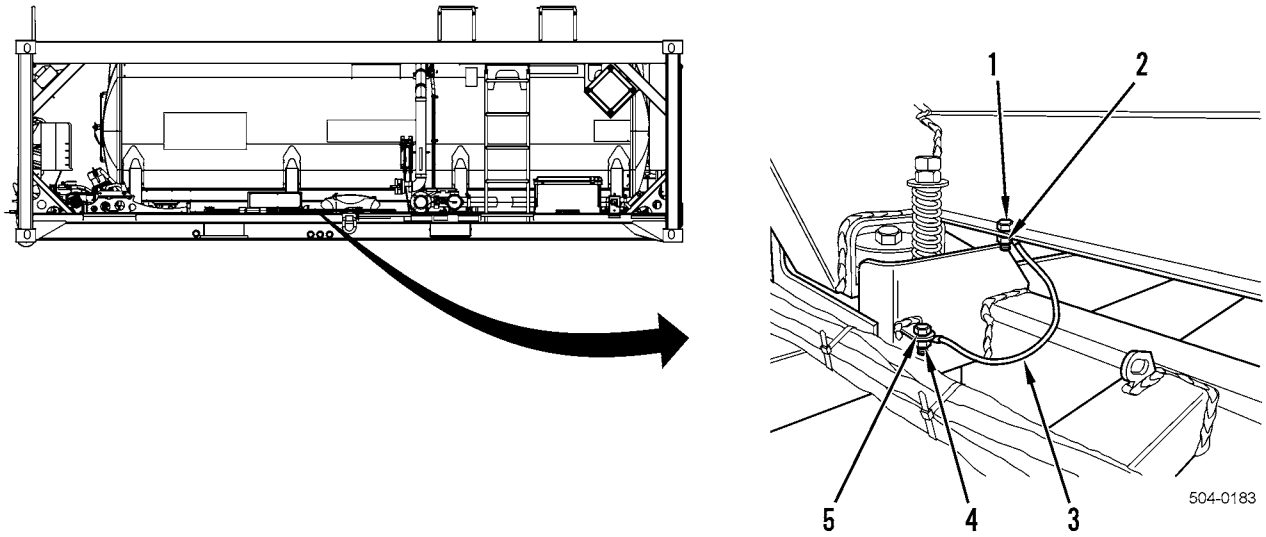


Figure 1. Ground Strap.

END OF TASK

INSTALLATION

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Install ground strap (Figure 2, Item 3), bolt (Figure 2, Item 5), and new locknut (Figure 2, Item 4) on tank.
2. Install ground strap (Figure 2, Item 3), bolt (Figure 2, Item 1), and new locknut (Figure 2, Item 2) on tank.

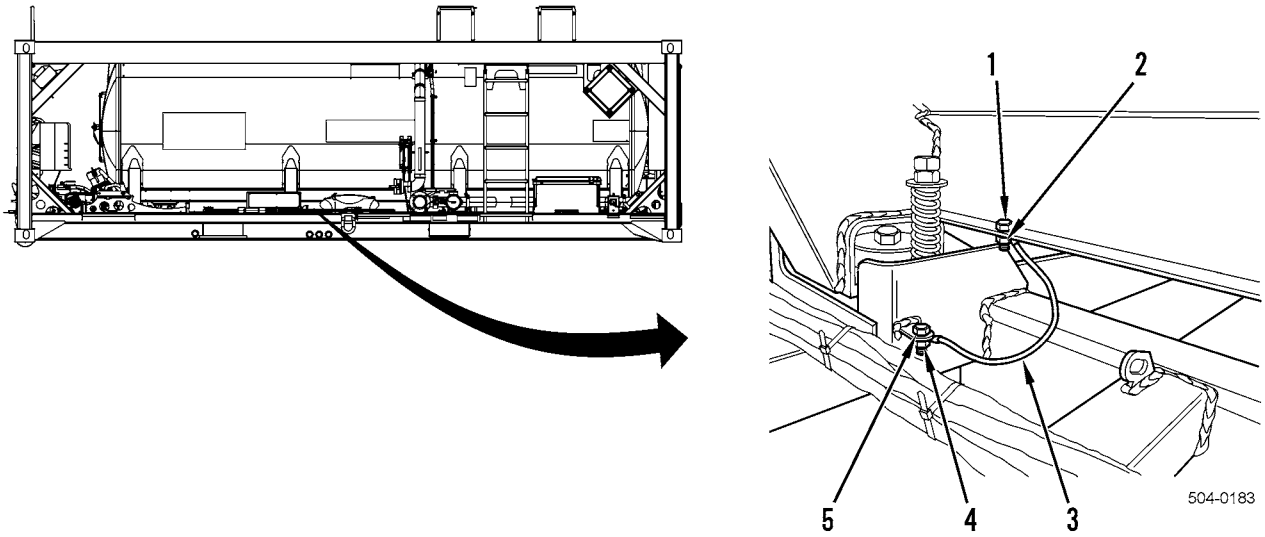


Figure 2. Ground Strap.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

COMPRESSION SPRINGS REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
15/16 in. crowfoot attachment, socket wrench, 3/8 in. drive (WP 0151, Item 2)
Wrench, torque, 120-600 lb-ft (WP 0151, Item 8)

Materials/Parts

Goggles, industrial (WP 0153, Item 7)
Nut, self-locking, hex (WP 0154, Item 14) (4)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

WP 0116

Equipment Condition

TRM shut down (WP 0022)
Battery box removed (WP 0057) (if necessary)
TRM mounted on PLS trailer (WP 0013) (if necessary)
Hose trough assembly removed (WP 0041) (if necessary)

REMOVAL

WARNING

Wear goggles when working with parts under pressure or tension. Failure to comply could result in an eye injury.

CAUTION

Use two wrenches when removing locknuts from stud. Failure to comply could result in damage to equipment.

NOTE

It may be necessary to remove other components to gain access depending on which helical compression spring needs replacing.

REMOVAL – CONTINUED

1. Position first wrench on locknut (Figure 1, Item 7) and hold locknut.
2. Using an assistant, remove locknut (Figure 1, Item 8) from stud (Figure 1, Item 5).
3. Have assistant hold locknut (Figure 1, Item 1 or 2) and remove locknut (Figure 1, Item 7) from stud (Figure 1, Item 5). Discard locknut.
4. Remove stud (Figure 1, Item 5), spring (Figure 1, Item 4), washer (Figure 1, Item 3), and two locknuts (Figure 1, Items 1 and 2) from frame (Figure 1, Item 6).
5. Remove washer (Figure 1, Item 3) and two locknuts (Figure 1, Item 1 and 2) from stud. Discard locknuts.

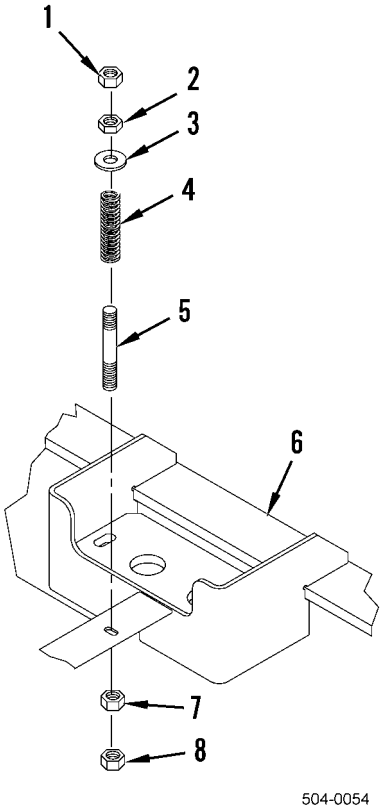


Figure 1. Compression Spring.

END OF TASK

INSTALLATION

WARNING

Wear goggles when working with parts under pressure or tension. Failure to comply could result in an eye injury.

CAUTION

Use two wrenches when installing locknuts on stud. Failure to comply could result in damage to equipment.

1. Install new locknut (Figure 1, Item 2) on stud (Figure 1, Item 5).
2. Install new locknut (Figure 1, Item 1) even with top of stud (Figure 1, Item 5).
3. Install washer (Figure 1, Item 3) and spring (Figure 1, Item 4) on stud (Figure 1, Item 5).
4. Install stud (Figure 1, Item 5) through frame (Figure 1, Item 6).
5. Have assistant hold locknut (Figure 1, Item 2) and install new locknut (Figure 1, Item 7).
6. Install new locknut (Figure 1, Item 8) until even with stud (Figure 1, Item 5) threads.
7. Tighten locknut (Figure 1, Item 1) until locked together with locknut (Figure 1, Item 2).
8. Tighten locknut (Figure 1, Item 8) until locked together with locknut (Figure 1, Item 7).
9. Install components removed per WP 0041 or WP 0057, as necessary.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

DATA PLATES AND BRACKETS REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)

Materials/Parts

Nut, self-locking, hex (WP 0154, Item 18) (4)
Rivet, pop (WP 0154, Item 27) (A/R)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0117

Equipment Condition

TRM shut down (WP 0022)

REMOVAL

WARNING

Wear goggles when removing rivets. Failure to comply could result in an eye injury.

NOTE

The number of rivets may vary with different data plates.

1. Remove pop-rivets (Figure 1, Item 1) and data plate (Figure 1, Item 2) from bracket (Figure 1, Item 3). Discard pop-rivets.
2. Remove four locknuts (Figure 1, Item 4), washers (Figure 1, Item 5), screws (Figure 1, Item 6), and bracket (Figure 1, Item 3) from TRM frame (Figure 1, Item 7). Discard locknuts.

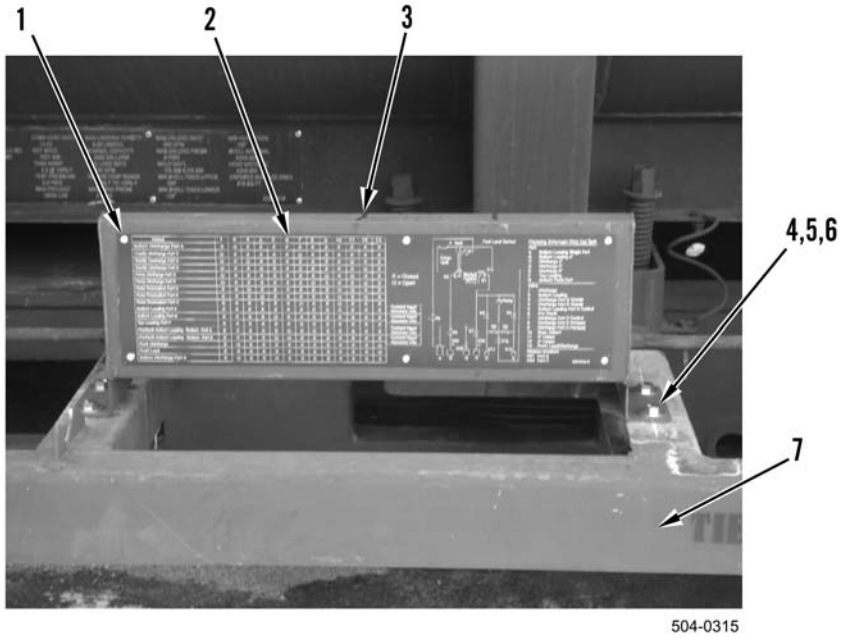


Figure 1. Data Plate and Bracket.

END OF TASK

INSTALLATION

1. Install bracket (Figure 1, Item 3), four screws (Figure 1, Item 6), washers (Figure 1, Item 5), and new locknuts (Figure 1, Item 4) on TRM frame (Figure 1, Item 7).
2. Using blind riveter kit, install new pop-rivets (Figure 1, Item 1) to secure data plate (Figure 1, Item 2) on bracket (Figure 1, Item 3).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

FIRE EXTINGUISHER BRACKETS REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Nut, self-locking, hex (WP 0154, Item 18) (4)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0119

Equipment Condition

TRM shut down (WP 0022)

REMOVAL

1. Release clamp (Figure 1, Item 1) on fire extinguisher bracket (Figure 1, Item 4).
2. Remove fire extinguisher (Figure 1, Item 6) from fire extinguisher bracket (Figure 1, Item 4).
3. Remove four locknuts (Figure 1, Item 3) and screws (Figure 1, Item 5) securing fire extinguisher bracket (Figure 1, Item 4) to TRM frame (Figure 1, Item 2). Discard locknuts.
4. Remove fire extinguisher bracket (Figure 1, Item 4) from TRM frame (Figure 1, Item 2).

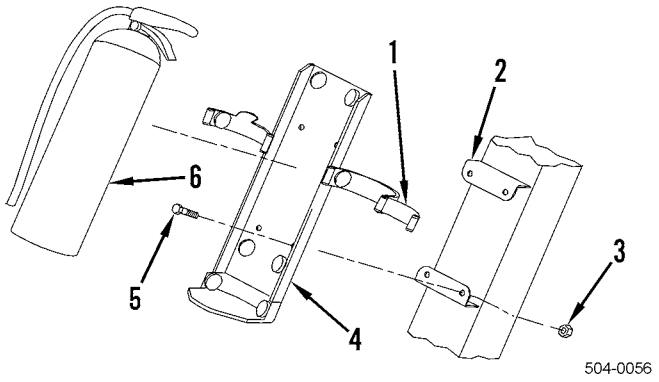


Figure 1. Fire Extinguisher Bracket.

END OF TASK

INSTALLATION

1. Position fire extinguisher bracket (Figure 2, Item 4) on TRM frame (Figure 2, Item 2).
2. Install four screws (Figure 2, Item 5) and new locknuts (Figure 2, Item 3) on fire extinguisher bracket (Figure 2, Item 4).
3. Tighten locknuts (Figure 2, Item 3) to secure fire extinguisher bracket (Figure 2, Item 4) to TRM frame (Figure 2, Item 2).
4. Install fire extinguisher (Figure 2, Item 6) in fire extinguisher bracket (Figure 2, Item 4).
5. Fasten clamp (Figure 2, Item 1) to secure fire extinguisher (Figure 2, Item 6) in fire extinguisher bracket (Figure 2, Item 4).

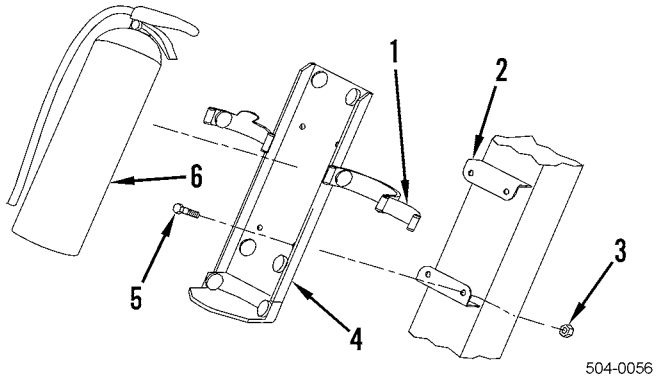


Figure 2. Fire Extinguisher Bracket.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

DRIP PAN BRACKET REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Nut, self-locking, hex (WP 0154, Item 16) (4)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0119

Equipment Condition

TRM shut down (WP 0022)
Fire extinguisher bracket removed (WP 0052)

REMOVAL

1. Remove locknut (Figure 1, Item 3) from bolt (Figure 1, Item 2). Discard locknut.
2. Remove bolt (Figure 1, Item 2) and drip pan hold down cable (Figure 1, Item 4) from drip pan bracket (Figure 1, Item 1).

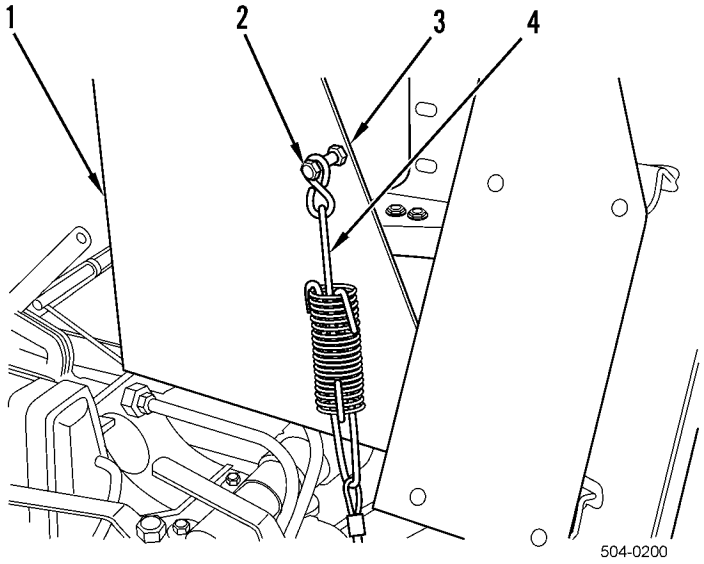


Figure 1. Drip Pan Hold Down Cable.

REMOVAL – CONTINUED

3. Remove two locknuts (Figure 2, Item 8), washers (Figure 2, Item 9), bolts (Figure 2, Item 10), and washers (Figure 2, Item 11) from drip pan bracket (Figure 2, Item 2). Discard locknuts.
4. Remove drip pan bracket (Figure 2, Item 2) from TRM frame (Figure 2, Item 1).
5. Remove locknut (Figure 2, Item 5), washer (Figure 2, Item 6), bolt (Figure 2, Item 3), washer (Figure 2, Item 4), and bracket (Figure 2, Item 7) from TRM frame (Figure 2, Item 1). Discard locknut.

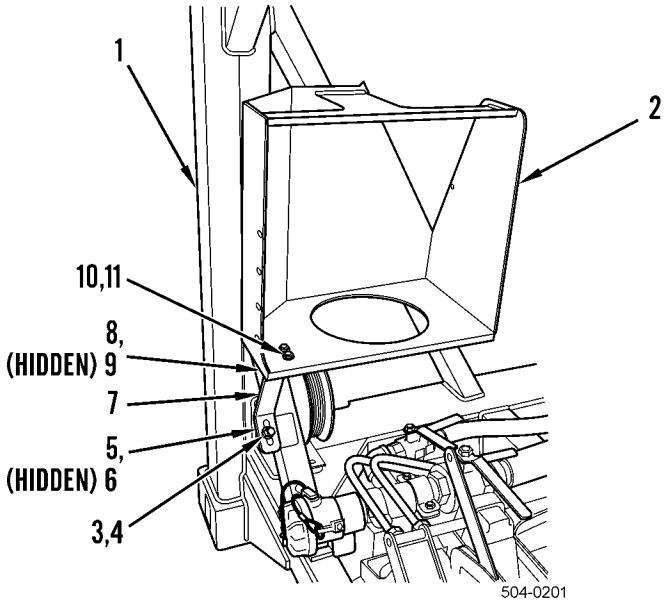


Figure 2. Drip Pan Bracket.

END OF TASK

INSTALLATION

1. Install bracket (Figure 2, Item 7), washer (Figure 2, Item 4), bolt (Figure 2, Item 3), washer (Figure 2, Item 6), and new locknut (Figure 2, Item 5), on TRM frame (Figure 2, Item 1).
2. Install drip pan bracket (Figure 2, Item 2) on TRM frame (Figure 2, Item 1).
3. Install two washers (Figure 2, Item 11), bolts (Figure 2, Item 10), washers (Figure 2, Item 9) and new locknuts (Figure 2, Item 8) on drip pan bracket (Figure 2, Item 2).

INSTALLATION – CONTINUED

4. Install drip pan hold down cable (Figure 3, Item 4) and bolt (Figure 3, Item 2) on drip pan bracket (Figure 3, Item 1).
5. Install new locknut (Figure 3, Item 3) on bolt (Figure 3, Item 2).

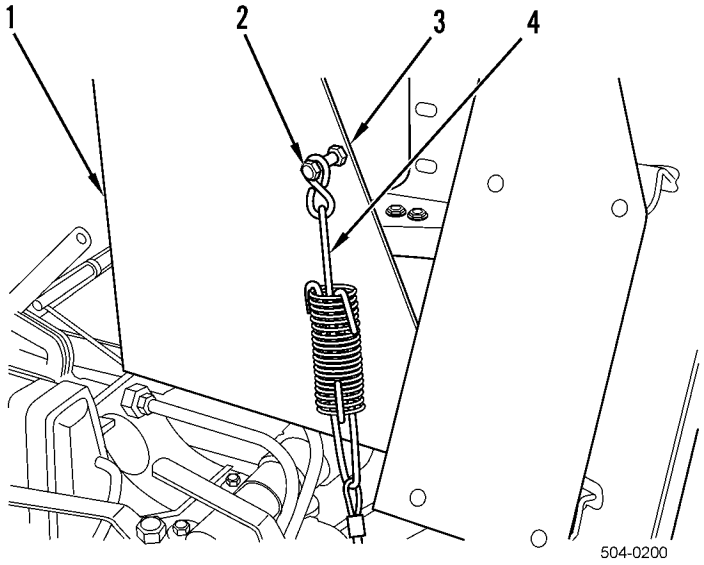


Figure 3. Drip Pan Hold Down Cable.

6. Install fire extinguisher bracket (WP 0052).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

BATTERIES SERVICE

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)

Materials/Parts

Apron, utility (WP 0153, Item 1)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Water, distilled (WP 0153, Item 20)

Personnel Required

Quartermaster and Chemical Equipment Operator 91J

Equipment Condition

TRM shut down (WP 0022)
Battery box lid removed (WP 0033)

WARNING

- Goggles, gloves, and apron must be worn whenever maintenance on batteries is being performed. Do not smoke, use open flame, make sparks, or create other ignition sources around batteries. Remove all jewelry such as rings, ID tags, watches, bracelets, and neck chains. If jewelry or a tool contacts a battery terminal, a direct short could result in instant heating or electrical shock.
- Do not overfill the battery. Too much electrolyte can cause excess pressure in the battery and cause battery acid to overflow through the vents releasing harmful fumes into the air.
- Sulfuric acid contained in batteries can cause serious burns. If battery corrosion or electrolyte makes contact with skin, eyes, or clothing, take immediate action to stop the corrosive burning effects as follows:
  - External: Immediately flush with cold running water to remove all acid.
  - Eyes: Flush with cold water for at least 15 minutes. Seek immediate medical attention.
  - Internal: Drink large amounts of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Seek immediate medical attention.
  - Clothing or Equipment: Wash at once with cold water. Neutralize with baking soda or household ammonia solution.
- Failure to comply could result in injury or death to personnel or damage to equipment.

1. Remove 12 battery caps (Figure 1, Item 3) from battery cell filler necks (Figure 1, Item 2).

CAUTION

Ensure only distilled water is added when levels drop below acceptable limits. Failure to comply could result in damage to equipment.

2. Fill batteries with distilled water to bottom of battery cell filler neck (Figure 1, Item 2), covering the plates inside the battery (Figure 1, Item 1).
3. Install 12 battery caps (Figure 1, Item 3).

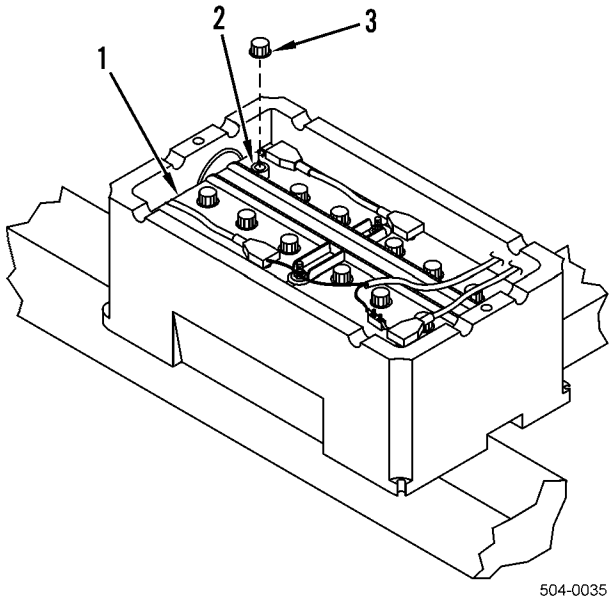


Figure 1. Batteries.

4. Install battery box lid (WP 0033).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

BATTERIES REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Apron, utility (WP 0153, Item 1)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0120

Equipment Condition

TRM shut down (WP 0022)
Battery cables removed (WP 0056)

REMOVAL

WARNING

- Goggles, gloves, and apron must be worn whenever maintenance on batteries is being performed. Do not smoke, use open flame, make sparks, or create other ignition sources around batteries. Remove all jewelry such as rings, ID tags, watches, bracelets, and neck chains. If jewelry or a tool contacts a battery terminal, a direct short could result in instant heating or electrical shock.
- Do not overfill the battery. Too much electrolyte can cause excess pressure in the battery and cause battery acid to overflow through the vents releasing harmful fumes into the air.
- Failure to comply could result in injury or death to personnel or damage to equipment.

REMOVAL – CONTINUED

1. Remove two nuts (Figure 1, Item 2) and battery hold down bracket (Figure 1, Item 1) from threaded rod (Figure 1, Item 4).
2. Remove two nuts (Figure 1, Item 3) from threaded rods (Figure 1, Item 4).
3. Remove two batteries (Figure 1, Item 6) from battery box (Figure 1, Item 5).

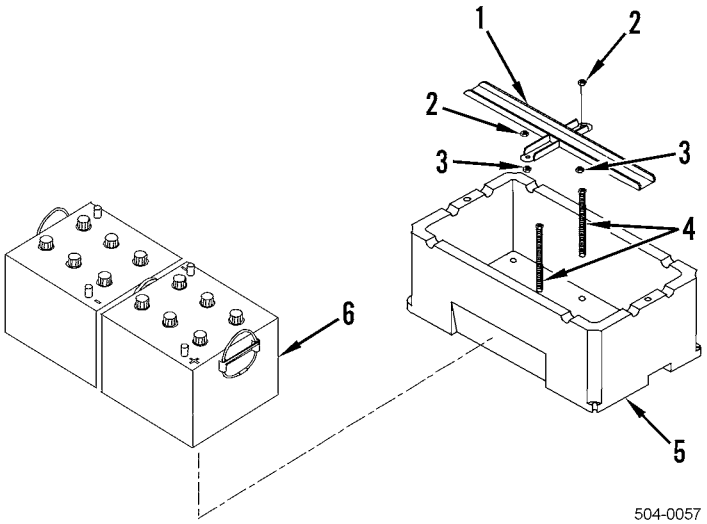


Figure 1. Batteries.

END OF TASK

INSTALLATION

WARNING

- Goggles, gloves, and apron must be worn whenever maintenance on batteries is being performed. Do not smoke, use open flame, make sparks, or create other ignition sources around batteries. Remove all jewelry such as rings, ID tags, watches, bracelets, and neck chains. If jewelry or a tool contacts a battery terminal, a direct short could result in instant heating or electrical shock.
- Do not overfill the battery. Too much electrolyte can cause excess pressure in the battery and cause battery acid to overflow through the vents releasing harmful fumes into the air.
- Failure to comply could result in injury or death to personnel or damage to equipment.

1. Position two batteries (Figure 1, Item 6) in battery box (Figure 1, Item 5).
2. Install two nuts (Figure 1, Item 3) on threaded rods (Figure 1, Item 4) even with top of batteries (Figure 1, Item 6).

INSTALLATION – CONTINUED

3. Install battery hold down bracket (Figure 1, Item 1) on batteries (Figure 1, Item 6) on threaded rods (Figure 1, Item 4).
4. Install two nuts (Figure 1, Item 2) on threaded rods (Figure 1, Item 4) securing battery hold down bracket (Figure 1, Item 1) to batteries (Figure 1, Item 6).
5. Install battery cables (WP 0056).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

BATTERY CABLES REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Petrolatum, technical (WP 0153, Item 15)
Strap, tiedown (WP 0153, Item 18)
Nut, self-locking, hex (WP 0154, Item 18) (4)
Washer, lock (WP 0154, Item 41) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0120

Equipment Condition

TRM shut down (WP 0022)
Battery box lid removed (WP 0033)

REMOVAL

WARNING

- Goggles, gloves, and apron must be worn whenever maintenance on batteries is being performed. Do not smoke, use open flame, make sparks, or create other ignition sources around batteries. Remove all jewelry such as rings, ID tags, watches, bracelets, and neck chains. If jewelry or a tool contacts a battery terminal, a direct short could result in instant heating or electrical shock.
- Do not make contact between two battery terminals. Extremely hot sparks could result in an explosion. Do not reverse battery polarity. Reversing polarity could result in an explosion or sudden discharge of electrolyte.
- Failure to comply could result in injury or death to personnel or damage to equipment.

REMOVAL – CONTINUED

1. Remove protective boot (Figure 1, Item 1) from negative battery cable (Figure 1, Item 2).

NOTE

Tag wiring before removal to aid in installation.

2. Remove nut (Figure 1, Item 13) on negative battery cable clamp (Figure 1, Item 14) and remove fuel pump assembly negative wire (Figure 1, Item 17). Replace nut (Figure 1, Item 13) on negative battery cable clamp (Figure 1, Item 14).
3. Using battery terminal puller, remove negative battery cable clamp (Figure 1, Item 14) from battery negative terminal (Figure 1, Item 11).
4. Remove nut (Figure 1, Item 22) and fuel pump assembly wiring harness ground wire (Figure 1, Item 21) from battery bracket bolt (Figure 1, Item 20). Replace nut.
5. Remove protective boot (Figure 1, Item 15) from positive battery cable (Figure 1, Item 7).
6. Remove nut (Figure 1, Item 16) on positive battery cable clamp (Figure 1, Item 8) and remove fuel pump assembly positive wire (Figure 1, Item 18) on circuit breaker (Figure 1, Item 19). Replace nut (Figure 1, Item 16) on positive battery cable clamp (Figure 1, Item 8).
7. Using battery terminal puller, remove positive battery cable clamp (Figure 1, Item 8) from battery positive terminal (Figure 1, Item 10).
8. Remove two protective boots (Figure 1, Item 3) from jumper cable (Figure 1, Item 4).
9. Loosen two nuts (Figure 1, Item 5) on battery jumper cable clamps (Figure 1, Item 6).

WARNING

The first jumper cable clamp removed must not come in contact with any metal surfaces to prevent grounding after removal. Electrical shock may occur. Failure to comply may result in injury or death to personnel or damage to equipment

10. Using battery terminal puller, remove two battery jumper cable clamps (Figure 1, Item 6) from battery negative terminal (Figure 1, Item 9) and battery positive terminal (Figure 1, Item 12).
11. Remove jumper cable (Figure 1, Item 4).
12. Remove tiedown straps as required when removing battery cables (Figure 1, Items 2 and 7).

REMOVAL – CONTINUED

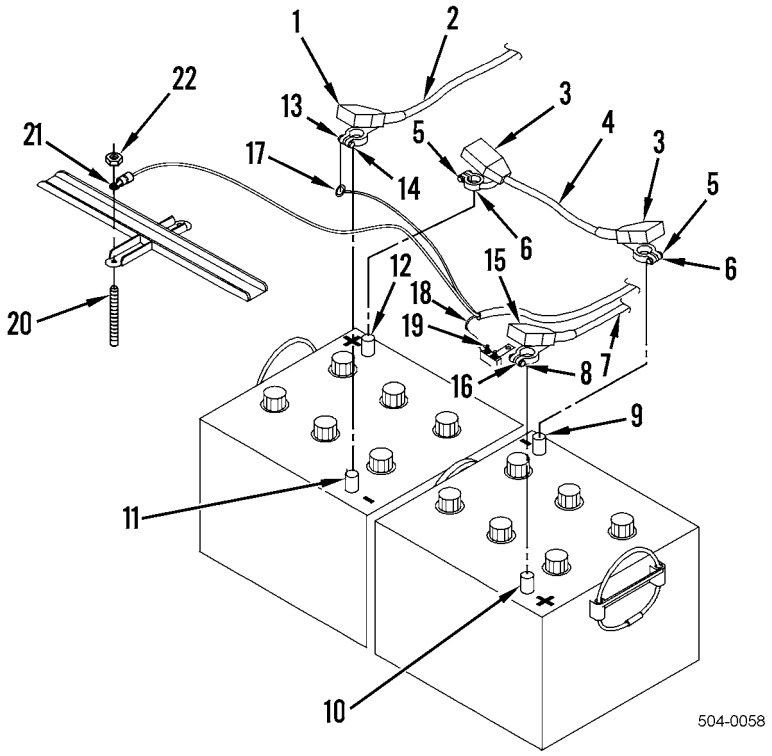


Figure 1. Battery Cables.

REMOVAL – CONTINUED

13. Remove two locknuts (Figure 2, Item 12) from two studs (Figure 2, Item 8) securing NATO enclosure lid (Figure 2, Item 1) to NATO slave base (Figure 2, Item 7). Discard locknuts.
14. Remove NATO enclosure lid (Figure 2, Item 1).
15. Remove screw (Figure 2, Item 11), lockwasher (Figure 2, Item 10), battery positive cable (Figure 2, Item 9), and solar panel positive wire (Figure 2, Item 13) from NATO slave connector (Figure 2, Item 2). Discard lockwasher.
16. Remove screw (Figure 2, Item 6), lockwasher (Figure 2, Item 5), battery negative cable (Figure 2, Item 3), and solar panel negative wire (Figure 2, Item 4) from NATO slave connector (Figure 2, Item 2). Discard lockwasher.
17. Pull battery negative cable (Figure 2, Item 3) and battery positive cable (Figure 2, Item 9) through back of NATO slave base (Figure 2, Item 7).

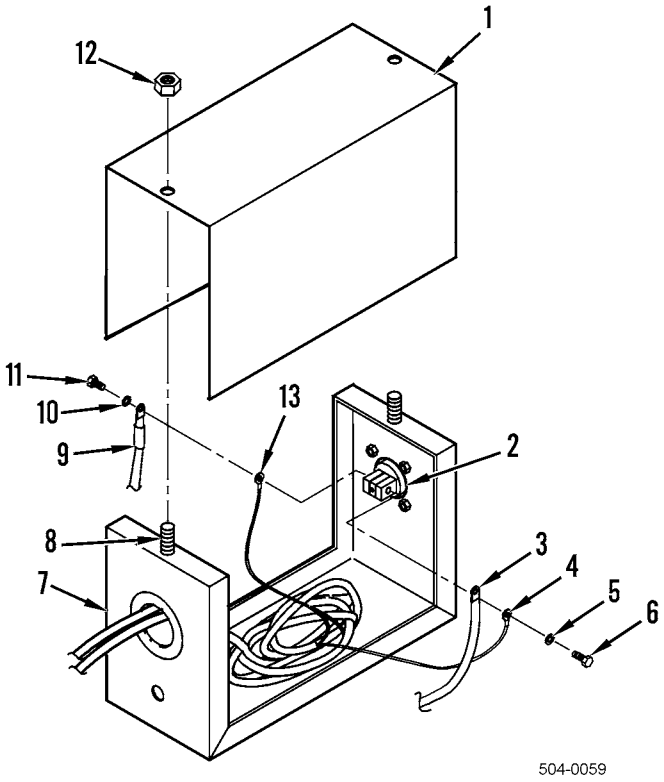


Figure 2. NATO Slave Connector and Wiring.

END OF TASK

INSTALLATION

WARNING

- Goggles, gloves, and apron must be worn whenever maintenance on batteries is being performed. Do not smoke, use open flame, make sparks, or create other ignition sources around batteries. Remove all jewelry such as rings, ID tags, watches, bracelets, and neck chains. If jewelry or a tool contacts a battery terminal, a direct short could result in instant heating or electrical shock.
- Do not make contact between two battery terminals. Extremely hot sparks could result in an explosion. Do not reverse battery polarity. Reversing polarity could result in an explosion or sudden discharge of electrolyte.
- Failure to comply could result in injury or death to personnel or damage to equipment.

1. Insert negative battery cable (Figure 2, Item 3) and positive battery cable (Figure 2, Item 9) through back of NATO slave base (Figure 2, Item 7).
2. Install screw (Figure 2, Item 6), new lockwasher (Figure 2, Item 5), battery negative cable (Figure 2, Item 3), and solar panel negative wire (Figure 2, Item 4) on NATO slave connector (Figure 2, Item 2). Tighten screw (Figure 2, Item 6).
3. Install screw (Figure 2, Item 11), new lockwasher (Figure 2, Item 10), battery positive cable (Figure 2, Item 9), and solar panel positive wire (Figure 2, Item 13) on NATO slave connector (Figure 2, Item 2). Tighten screw (Figure 2, Item 11).
4. Install NATO enclosure lid (Figure 2, Item 1) on NATO slave base (Figure 2, Item 7).
5. Install two new locknuts (Figure 2, Item 12) on two studs (Figure 2, Item 8) securing NATO enclosure lid (Figure 2, Item 1) to NATO slave base (Figure 2, Item 7). Tighten locknuts (Figure 2, Item 12).

INSTALLATION – CONTINUED

6. Lightly lubricate battery cable clamps (Figure 3, Items 8 and 14), battery jumper cable clamps (Figure 3, Item 6), battery positive terminals (Figure 3, Items 10 and 12) and battery negative terminals (Figure 3, Items 9 and 11) with petrolatum.
7. Install positive battery cable clamp (Figure 3, Item 8) on battery positive terminal (Figure 3, Item 10).
8. Remove nut (Figure 3, Item 16) and attach fuel pump assembly positive wire (Figure 3, Item 18) to circuit breaker (Figure 3, Item 19) on positive battery cable clamp (Figure 3, Item 8).
9. Install and tighten nut (Figure 3, Item 16) on positive battery cable clamp (Figure 3, Item 8).
10. Install protective boot (Figure 3, Item 15) on positive battery cable (Figure 3, Item 7).
11. Install battery jumper cable clamps (Figure 3, Item 6) on battery negative terminal (Figure 3, Item 9) and battery positive terminal (Figure 3, Item 12).
12. Tighten nuts (Figure 3, Item 5) on battery jumper cable clamps (Figure 3, Item 6).
13. Install protective boots (Figure 3, Item 3) on jumper cable (Figure 3, Item 4).
14. Remove nut (Figure 3, Item 13) and attach fuel pump assembly negative wire (Figure 3, Item 17) on battery negative cable clamp (Figure 3, Item 14).
15. Remove nut (Figure 3, Item 22) from battery bracket bolt (Figure 3, Item 20) and install fuel pump assembly wiring harness ground wire (Figure 3, Item 21) with nut (Figure 3, Item 22).

WARNING

The battery negative cable end must not come in contact with any metal surfaces to prevent grounding before installation. Electrical shock may occur. Failure to comply could result in injury or death to personnel or damage to equipoment.

16. Install battery negative cable clamp (Figure 3, Item 14) on battery negative terminal (Figure 3, Item 11).
17. Install and tighten nut (Figure 3, Item 13) on battery negative cable clamp (Figure 3, Item 14).
18. Install protective boot (Figure 3, Item 1) on negative battery cable (Figure 3, Item 2).

INSTALLATION – CONTINUED

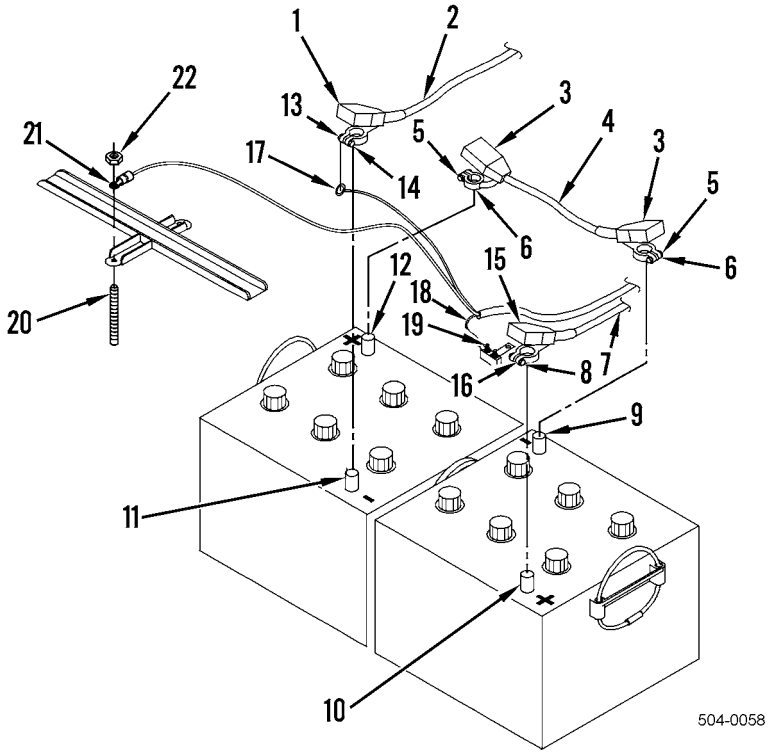


Figure 3. Battery Cables.

19. Install tiedown straps as required.
20. Install battery box lid (WP 0033).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

BATTERY BOX REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Nut, self-locking, hex (WP 0154, Item 18) (4)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0120

Equipment Condition

TRM shut down (WP 0022)
Batteries removed (WP 0055)

REMOVAL

1. Remove four locknuts (Figure 1, Item 6) securing battery box (Figure 1, Item 1) to TRM frame (Figure 1, Item 5). Discard locknuts.
2. Remove four screws (Figure 1, Item 2) and washers (Figure 1, Item 3) from battery box (Figure 1, Item 1) and battery box lower hold down (Figure 1, Item 4).
3. Remove battery box (Figure 1, Item 1) and battery box lower hold down (Figure 1, Item 4).

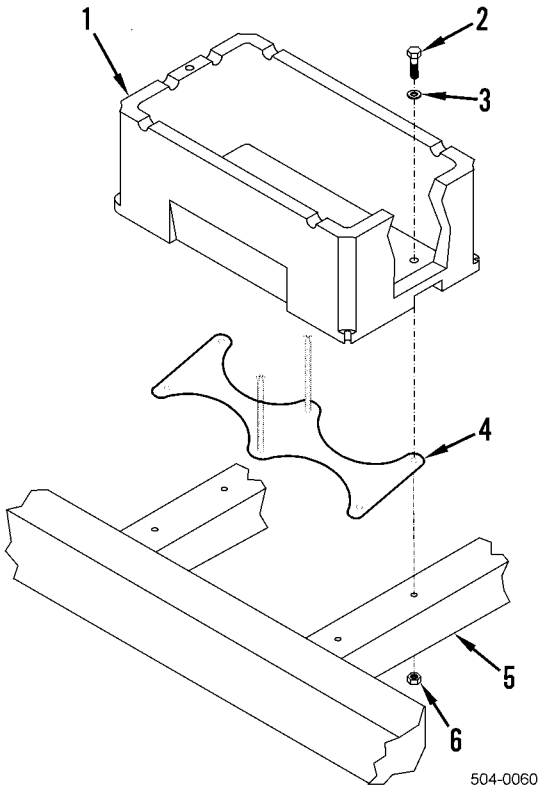


Figure 1. Battery Box.

END OF TASK

INSTALLATION

1. Position battery box (Figure 2, Item 1) and battery box lower hold down (Figure 2, Item 4) on TRM frame (Figure 2, Item 5).
2. Install four screws (Figure 2, Item 2) and washers (Figure 2, Item 3) in battery box (Figure 2, Item 1), battery box lower hold down (Figure 2, Item 4) and TRM frame (Figure 2, Item 5).
3. Install four new locknuts (Figure 2, Item 6) on screws (Figure 2, Item 2).

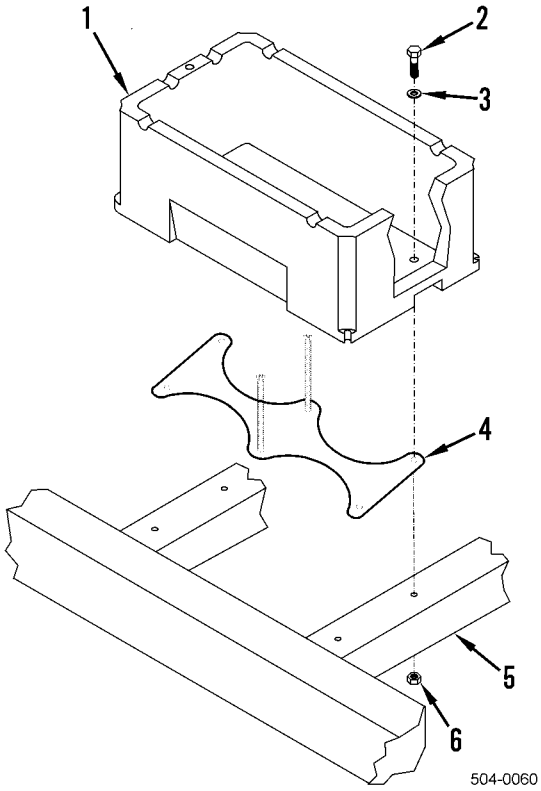


Figure 2. Battery Box.

4. Install batteries (WP 0055).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

BATTERY CHARGER REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Goggles, industrial (WP 0153, Item 7)
Strap, tiedown (WP 0153, Item 18)
Nut, lock, hex (WP 0154, Item 11) (4)
Nut, self-locking, hex (WP 0154, Item 16) (2)
Nut, self-locking, hex (WP 0154, Item 18) (3)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0121

Equipment Condition

TRM shut down (WP 0022)
Battery box lid removed (WP 0033)
Battery negative cable removed (WP 0056-2, steps 1 - 3)

REMOVAL

1. Remove two locknuts (Figure 1, Item 1) from studs (Figure 1, Item 3) securing NATO enclosure lid (Figure 1, Item 2) to NATO slave base (Figure 1, Item 4). Discard locknuts.
2. Remove NATO enclosure lid (Figure 1, Item 2) from NATO slave base (Figure 1, Item 4).

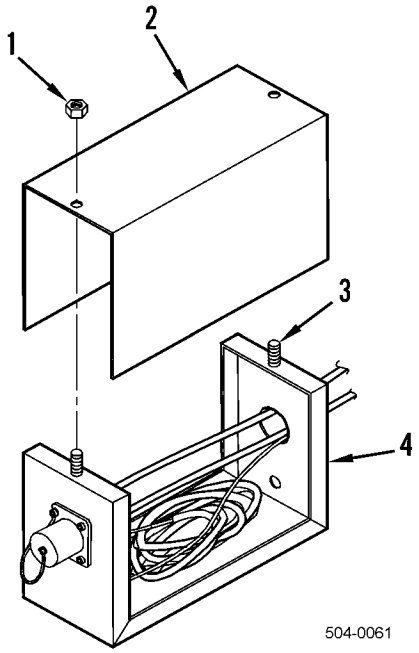


Figure 1. NATO Enclosure Lid.

REMOVAL – CONTINUED

WARNING

Goggles must be worn when performing this procedure. Remove all jewelry such as rings, ID tags, watches, bracelets, and neck chains. If jewelry or a tool makes contact across an electrical circuit, a direct short could result in instant heating or electrical shock. Do not allow the positive and negative cables to make contact with each other or any metal part of the equipment. Failure to comply could result in injury or death to personnel or damage to equipment.

NOTE

Tag wiring before removal to aid in installation.

3. Remove tiedown strap around bundle of wires (Figure 2, Item 5) and discard.
4. Pull grommet (Figure 2, Item 1) into NATO slave base (Figure 2, Item 3).
5. Disconnect connectors (Figure 2, Item 4).
6. Pull solar panel wiring (Figure 2, Item 2) through grommet (Figure 2, Item 1) and back of NATO slave base (Figure 2, Item 3).
7. Remove tiedown straps as required and discard.
8. Follow solar panel wiring (Figure 2, Item 2) to studs (Figure 3, Item 6) and remove locknuts (Figure 3, Item 8) securing loop clamps (Figure 3, Item 7) to studs (Figure 3, Item 6). Discard locknuts.
9. Remove loop clamps (Figure 3, Item 7) and solar panel wiring (Figure 2, Item 2) from stud (Figure 3, Item 6) on tank (Figure 3, Item 9).

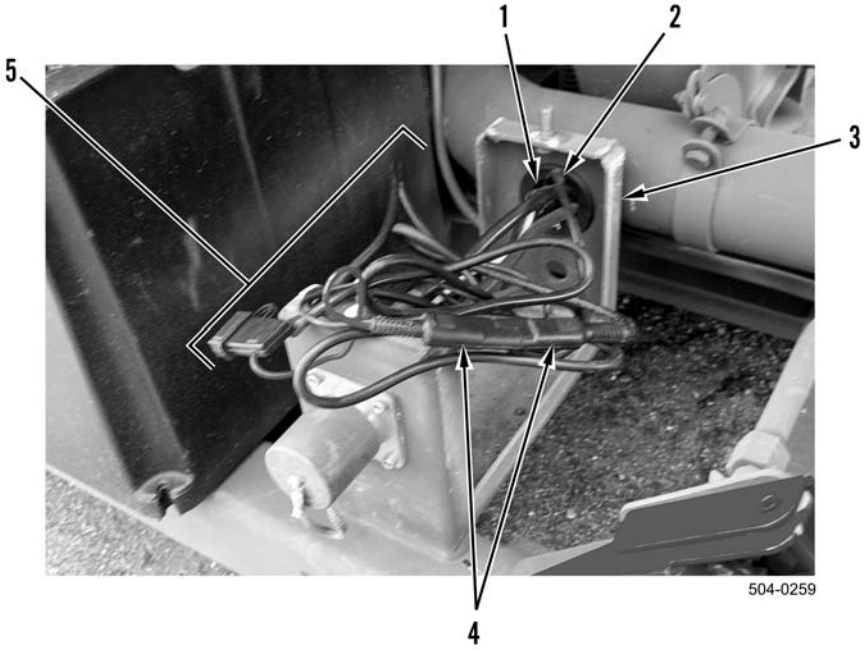


Figure 2. NATO Slave Connector and Associated Wiring.

REMOVAL – CONTINUED

10. Remove four locknuts (Figure 3, Item 4) from four screws (Figure 3, Item 2) and four washers (Figure 3, Item 3) securing solar panel (Figure 3, Item 1) to solar panel mounting plate (Figure 3, Items 5 and 10). Discard locknuts.
11. Remove the solar panel (Figure 3, Item 1) from mounting plates (Figure 3, Items 5 and 10).

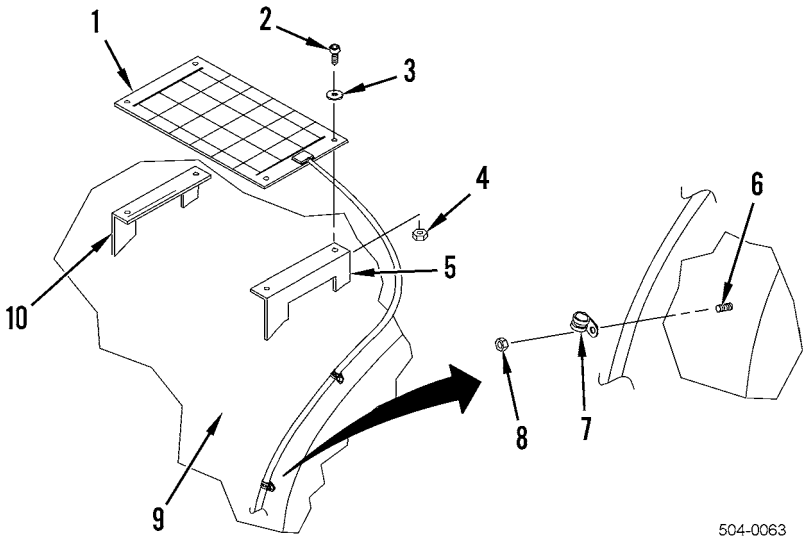


Figure 3. Battery Charger and Wiring.

END OF TASK

INSTALLATION

1. Position solar panel (Figure 3, Item 1) on solar panel mounting plates (Figure 3, Items 5 and 10).
2. Install four screws (Figure 3, Item 2), four washers (Figure 3, Item 3), and four new locknuts (Figure 3, Item 4) to solar panel (Figure 3, Item 1) and solar panel mounting plates (Figure 3, Items 5 and 10).
3. Install loop clamps (Figure 3, Item 7) on solar panel wiring (Figure 4, Items 5 and 8) and studs (Figure 3, Item 6).
4. Install new locknuts (Figure 3, Item 8) on studs (Figure 3, Item 6) securing loop clamps (Figure 3, Item 7) to tank (Figure 3, Item 9).
5. Secure solar panel wiring (Figure 2, Item 2) with new tiedown straps as required.

INSTALLATION – CONTINUED

WARNING

Goggles must be worn when performing this procedure. Remove all jewelry such as rings, ID tags, watches, bracelets, and neck chains. If jewelry or a tool makes contact across an electrical circuit, a direct short could result in instant heating or electrical shock. Do not allow the positive and negative cables to make contact with each other or any metal part of the equipment. Failure to comply could result in injury or death to personnel or damage to equipment.

6. Thread solar panel wiring (Figure 4, Item 2) through grommet (Figure 4, Item 1) and back of NATO slave base (Figure 4, Item 3).
7. Connect connectors (Figure 4, Item 4).
8. Bundle wires (Figure 4, Item 5) together and secure with new tiedown strap.

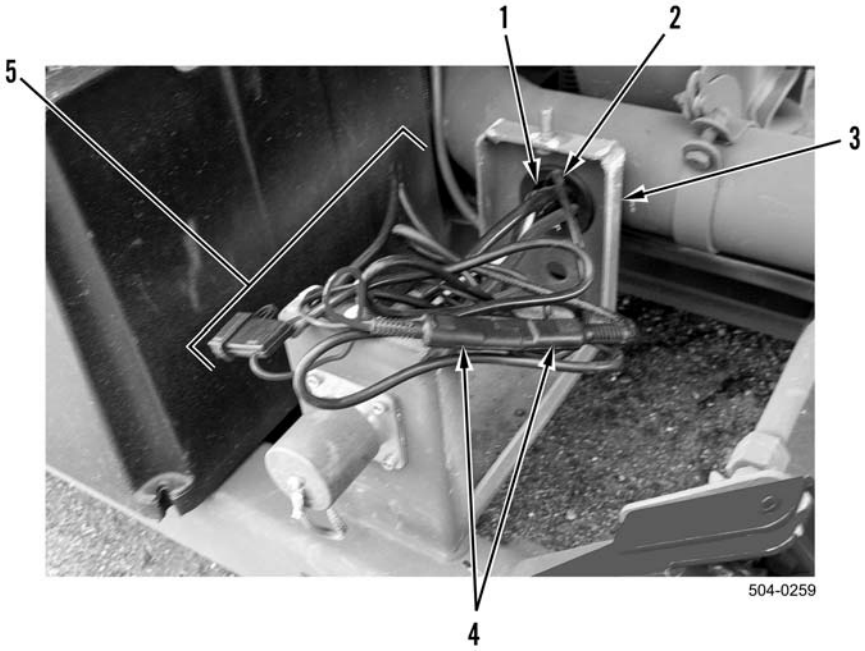


Figure 4. NATO Slave Connector and Associated Wiring.

INSTALLATION – CONTINUED

9. Install NATO enclosure lid (Figure 5, Item 2) on NATO slave base (Figure 5, Item 1).
10. Install two new locknuts (Figure 5, Item 1) on two studs (Figure 5, Item 3) to secure NATO enclosure lid (Figure 5, Item 2) to NATO slave base (Figure 5, Item 4).

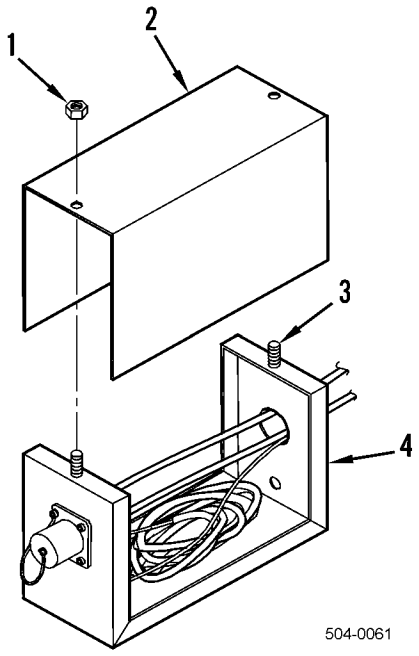


Figure 5. NATO Enclosure Lid.

11. Install battery negative cable (WP 0056-6, steps 15 - 20).
12. Install battery box lid (WP 0033).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

NATO SLAVE CONNECTOR REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Goggles, industrial (WP 0153, Item 7)
Nut, self-locking, hex (WP 0154, Item 12) (4)
Nut, self-locking, hex (WP 0154, Item 18) (2)
Washer, lock (WP 0154, Item 41) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0122

Equipment Condition

TRM shut down (WP 0022)
Battery box lid removed (WP 0033)
Battery negative cable removed (WP 0056-2, steps 1 - 3)

REMOVAL

1. Remove two locknuts (Figure 1, Item 1) from NATO enclosure lid (Figure 1, Item 2). Discard locknuts.
2. Remove NATO enclosure lid (Figure 1, Item 2) from NATO slave base (Figure 1, Item 3).

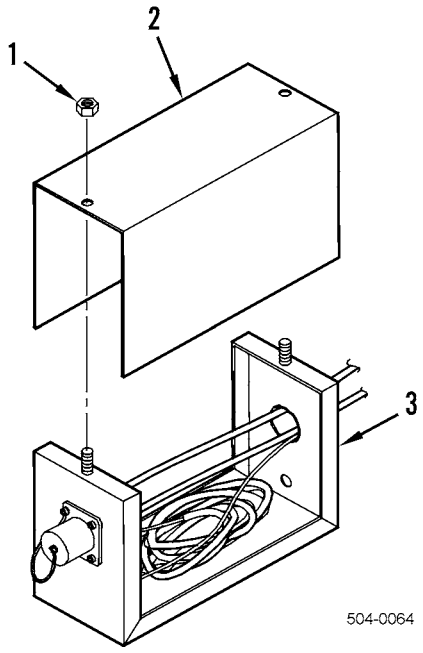


Figure 1. NATO Enclosure Lid.

REMOVAL – CONTINUED

WARNING

Goggles must be worn when performing this procedure. Remove all jewelry such as rings, ID tags, watches, bracelets, and neck chains. If jewelry or a tool makes contact across an electrical circuit, a direct short could result in instant heating or electrical shock. Do not allow the positive and negative cables to make contact with each other or any metal part of the equipment. Failure to comply could result in injury or death to personnel or damage to equipment.

3. Tag wires connected to NATO slave connector (Figure 2, Item 2).
4. Remove screw (Figure 2, Item 11) and lockwasher (Figure 2, Item 12) securing battery positive cable (Figure 2, Item 13) and solar panel positive wire (Figure 2, Item 1) to NATO slave connector (Figure 2, Item 2). Discard lockwasher.
5. Remove screw (Figure 2, Item 8) and lockwasher (Figure 2, Item 9) securing battery negative cable (Figure 2, Item 6) and solar panel negative wire (Figure 2, Item 7) from NATO slave connector (Figure 2, Item 2). Discard lockwasher.
6. Remove four screws (Figure 2, Item 3) and locknuts (Figure 2, Item 5) securing NATO slave connector (Figure 2, Item 2) to NATO slave base (Figure 2, Item 10). Discard locknuts.
7. Remove NATO slave connector (Figure 2, Item 2) and rubber gasket (Figure 2, Item 4) from NATO slave base (Figure 2, Item 10).

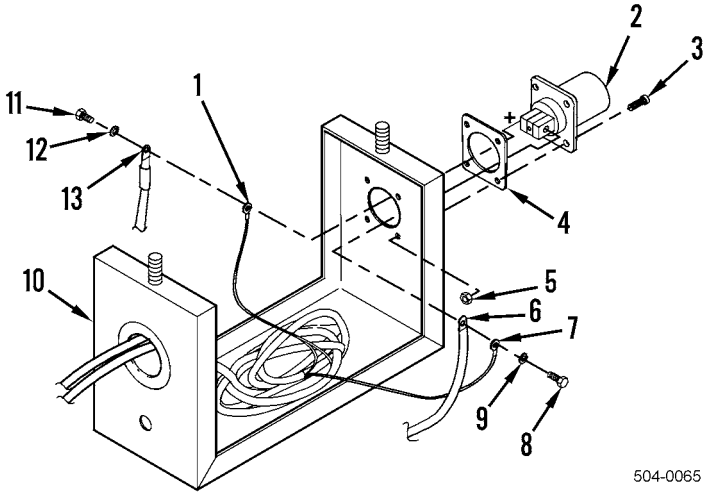


Figure 2. NATO Slave Connector.

END OF TASK

INSTALLATION

1. Position rubber gasket (Figure 2, Item 4) on NATO slave connector (Figure 2, Item 2).
2. Position NATO slave connector (Figure 2, Item 2) on NATO slave base (Figure 2, Item 10).
3. Install four screws (Figure 2, Item 3), new locknuts (Figure 2, Item 5) and NATO slave connector (Figure 2, Item 2).

INSTALLATION – CONTINUED

WARNING

Goggles must be worn when performing this procedure. Remove all jewelry such as rings, ID tags, watches, bracelets, and neck chains. If jewelry or a tool makes contact across an electrical circuit, a direct short could result in instant heating or electrical shock. Do not allow the positive and negative cables to make contact with each other or any metal part of the equipment. Failure to comply could result in injury or death to personnel or damage to equipment.

4. Position battery positive cable (Figure 2, Item 13) and solar panel positive wire (Figure 2, Item 1) on NATO slave connector (Figure 2, Item 2).
5. Install screw (Figure 2, Item 11) and new lockwasher (Figure 2, Item 12) on battery positive cable (Figure 2, Item 13) and solar panel positive wire (Figure 2, Item 1) to NATO slave connector (Figure 2, Item 2). Tighten screw (Figure 2, Item 11).
6. Position battery negative cable (Figure 2, Item 6) and solar panel negative wire (Figure 2, Item 7) on NATO slave connector (Figure 2, Item 2).
7. Install screw (Figure 2, Item 8) and new lockwasher (Figure 2, Item 9) on battery negative cable (Figure 2, Item 6) and solar panel negative wire (Figure 2, Item 7) to NATO slave connector (Figure 2, Item 2).
8. Remove tags.
9. Position NATO enclosure lid (Figure 3, Item 2) on NATO slave base (Figure 3, Item 3) and install two new locknuts (Figure 3, Item 1).

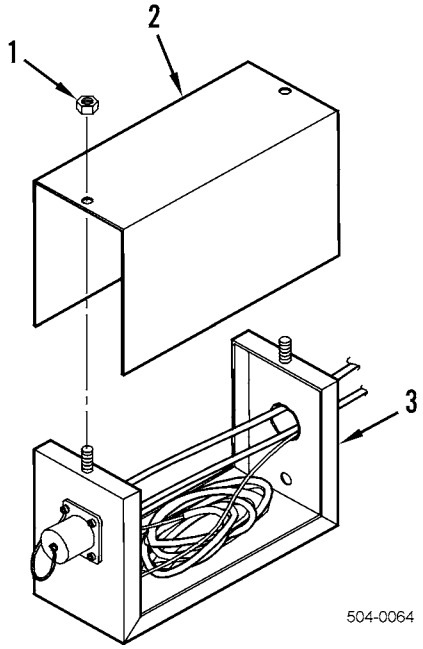


Figure 3. NATO Slave Connector.

INSTALLATION – CONTINUED

10. Install battery negative cable (WP 0056-6, steps 15 - 20).
11. Install battery box lid (WP 0033).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

NATO SLAVE BASE GROMMET REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Hammer, hand (WP 0152, Table 2, Item 2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0122

Equipment Condition

TRM shut down (WP 0022)
Wires removed from NATO slave connector (WP 0059)

REMOVAL

WARNING

Goggles must be worn when performing this procedure. Remove all jewelry such as rings, ID tags, watches, bracelets, and neck chains. If jewelry or a tool makes contact across an electrical circuit, a direct short could result in instant heating or electrical shock. Do not allow the positive and negative cables to make contact with each other or any metal part of the equipment. Failure to comply could result in injury or death to personnel or damage to equipment.

NOTE

Tag wiring before removal to aid in installation.

REMOVAL – CONTINUED

Remove grommet (Figure 1, Item 1) over wires (Figure 1, Item 3) and from back of NATO slave base (Figure 1, Item 2).

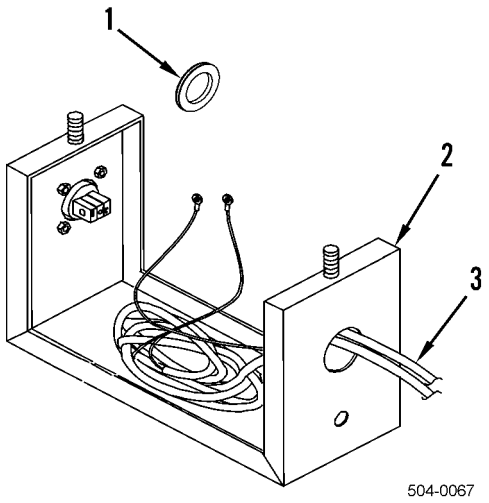


Figure 1. NATO Slave Base Grommet.

END OF TASK

INSTALLATION

WARNING

Goggles must be worn when performing this procedure. Remove all jewelry such as rings, ID tags, watches, bracelets, and neck chains. If jewelry or a tool makes contact across an electrical circuit, a direct short could result in instant heating or electrical shock. Do not allow the positive and negative cables to make contact with each other or any metal part of the equipment. Failure to comply could result in injury or death to personnel or damage to equipment.

1. Install grommet (Figure 1, Item 1) over wires (Figure 1, Item 3) and on back of NATO slave base (Figure 1, Item 2).
2. Install wires to NATO slave connector (WP 0059).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

TANK COVER PLATE REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Knife, putty (WP 0152, Table 2, Item 3)

Materials/Parts

Cloth, cleaning (WP 0153, Item 5)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Loctite sealant 515 (WP 0153, Item 11)
Gasket (WP 0154, Item 3)
Nut, self-locking, hex (WP 0154, Item 13) (4)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0123

Equipment Condition

TRM shut down (WP 0022)

REMOVAL

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

REMOVAL – CONTINUED

1. Open manhole cover to relieve pressure.
2. Remove four locknuts (Figure 1, Item 1) and washers (Figure 1, Item 2), and tank cover plate (Figure 1, Item 3) from tank (Figure 1, Item 5). Discard locknuts.
3. Remove gasket (Figure 1, Item 4) from studs (Figure 1, Item 6) on tank (Figure 1, Item 5). Discard gasket.

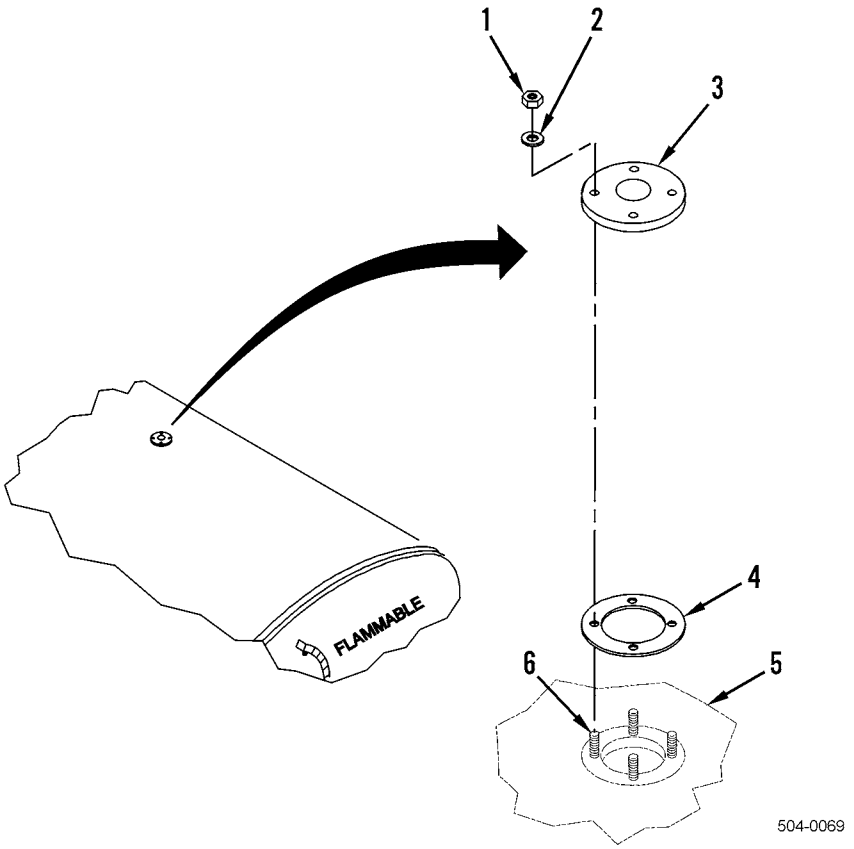


Figure 1. Tank Cover Plate.

WARNING

Wear goggles to prevent foreign objects from entering your eyes. Failure to comply could result in eye injury.

4. Clean any gasket debris from mating surfaces.
5. Using cleaning cloth, wipe up any spilled fuel.

END OF TASK

INSTALLATION

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

1. Install new gasket (Figure 1, Item 4) with sealing compound on studs (Figure 1, Item 6) to tank (Figure 1, Item 5).
2. Install tank cover plate (Figure 1, Item 3), four washers (Figure 1, Item 2), and new locknuts (Figure 1, Item 1) to tank (Figure 1, Item 5).
3. Close manhole cover.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

REAR HEAD TANK GAUGE REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Nut, lock, hex (WP 0154, Item 10) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0124

Equipment Condition

TRM shut down (WP 0022)

Rear head tank gauge pointer removed (WP 0066)

REMOVAL

1. Remove two locknuts (Figure 1, Item 1) and screws (Figure 1, Item 3) securing rear head tank gauge (Figure 1 Item 2) to tank assembly (Figure 1, Item 4). Discard locknuts.
2. Remove rear head tank gauge (Figure 1, Item 2) from tank assembly (Figure 1, Item 4).

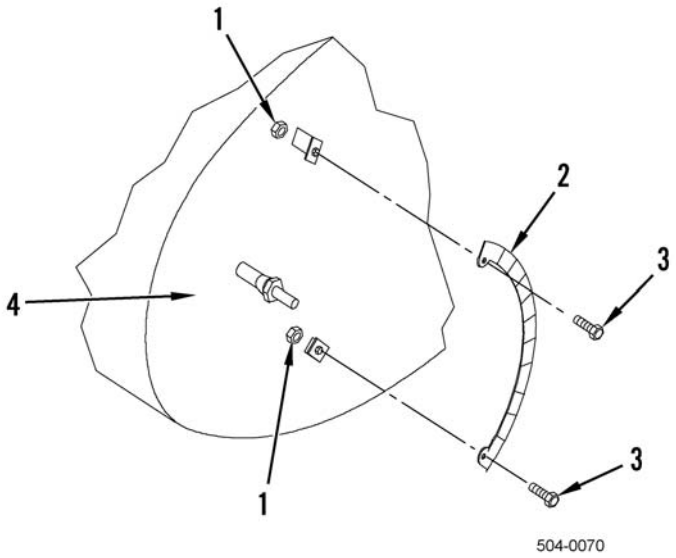


Figure 1. Rear Head Tank Gauge.

END OF TASK

INSTALLATION

1. Install rear head tank gauge (Figure 2, Item 2) on tank assembly (Figure 2, Item 4).
2. Install two screws (Figure 2, Item 3) and new locknuts (Figure 2, Item 1) on tank assembly (Figure 2, Item 4).

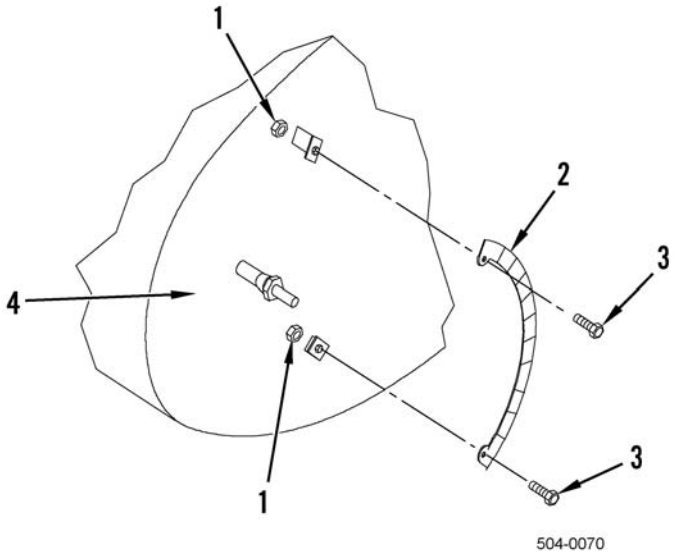


Figure 2. Rear Head Tank Gauge.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

REAR HEAD TANK GAUGE POINTER REPAIR
Removal, Installation, Adjustment

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Petrolatum, technical (WP 0153, Item 15)
Gasket (WP 0154, Item 2)
Retainer, packing (WP 0154, Item 24)
Washer, lock (WP 0154, Item 38)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

WP 0124

Equipment Condition

TRM shut down (WP 0022)
TRM drained (WP 0017)

REMOVAL

WARNING

- Ensure tank is drained.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed onto face.
- Failure to do so may result in injury or death to personnel.

1. Open manhole cover.
2. Remove nut (Figure 1, Item 1), lockwasher (Figure 1, Item 2), washer (Figure 1, Item 5), and screw (Figure 1, Item 6) securing pointer (Figure 1, Item 4) to tank gauge pointer clamp (Figure 1, Item 3). Discard lockwasher.
3. Remove pointer (Figure 1, Item 4) from tank gauge pointer clamp (Figure 1, Item 3).

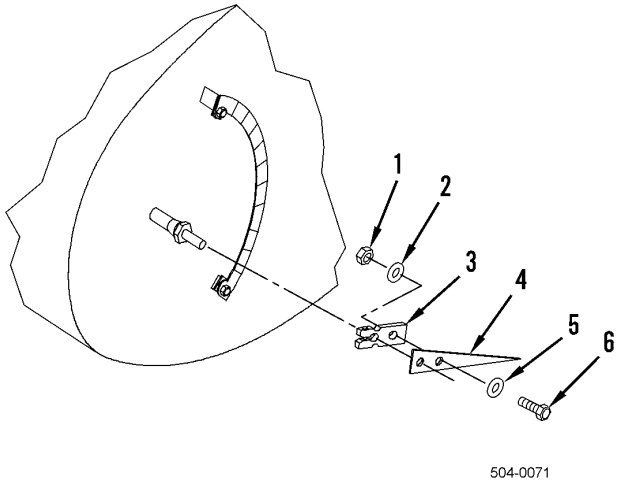


Figure 1. Rear Head Tank Gauge Pointer.

REMOVAL – CONTINUED

4. Remove tank gauge gasket and packing retainer.
   a. Loosen screw (Figure 2, Item 6) from tank gauge pointer clamp (Figure 2, Item 5).
   b. Remove tank gauge pointer clamp (Figure 2, Item 5) and two washers (Figure 2, Item 4).
   c. Remove stem cap (Figure 2, Item 3) from stem (Figure 2, Item 7).
   d. Remove packing retainer (Figure 2, Item 2) from shaft (Figure 2, Item 8). Discard packing retainer.
   e. Remove tank gauge gasket (Figure 2, Item 1) from stem (Figure 2, Item 7). Discard gasket.

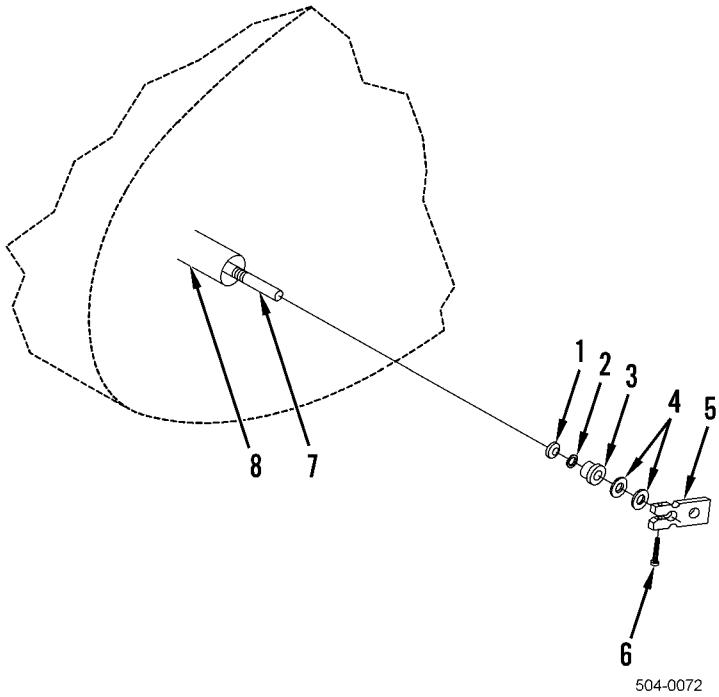


Figure 2. Tank Gauge Gasket and Stem.

END OF TASK

INSTALLATION

1. Install tank gauge gasket (Figure 2, Item 1) and packing retainer (Figure 2, Item 2).
   a. Insert tank gauge gasket (Figure 2, Item 1) onto stem (Figure 2, Item 7).
   b. Lightly lubricate new packing retainer (Figure 2, Item 2) with petrolatum and install packing retainer (Figure 2, Item 2) on stem (Figure 2, Item 7).
   c. Install and tighten stem cap (Figure 2, Item 3) on stem (Figure 2, Item 7). Tighten stem cap (Figure 2, Item 3).
   d. Position two washers (Figure 2, Item 4) and tank gauge pointer clamp (Figure 2, Item 5) on stem (Figure 2, Item 7).

INSTALLATION – CONTINUED

2. Install pointer.
   a. Position pointer (Figure 3, Item 4) on tank gauge pointer clamp (Figure 3, Item 3).
   b. Install screw (Figure 3, Item 6), washer (Figure 3, Item 5), new lockwasher (Figure 3, Item 2), and nut (Figure 3, Item 1) to secure pointer (Figure 3, Item 4) to tank gauge pointer clamp (Figure 3, Item 5).

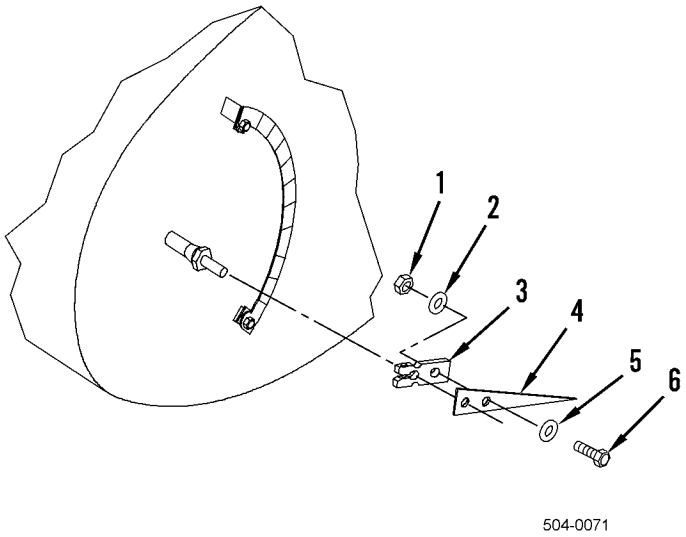


Figure 3. Rear Head Tank Gauge Pointer.

END OF TASK

ADJUSTMENT

1. Loosen screw (Figure 4, Item 3) on tank gauge pointer clamp (Figure 4, Item 1).
2. Adjust pointer (Figure 4, Item 2) ¾ in. below the 50-gal. mark on the rear head tank gauge.
3. Tighten screw (Figure 4, Item 3) on tank gauge pointer clamp (Figure 4, Item 1).
4. Repeat steps 1-3 if pointer (Figure 4, Item 2) is incorrect.

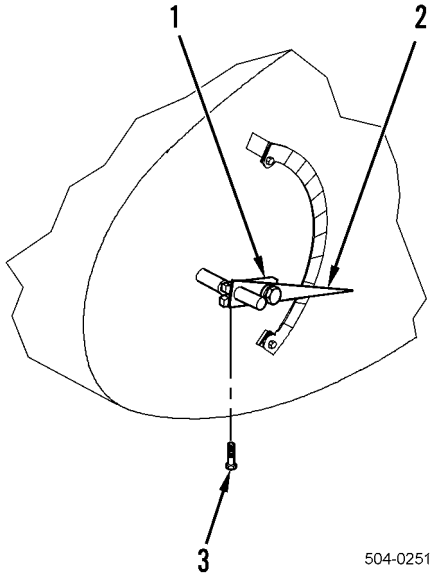


Figure 4. Rear Head Tank Gauge Pointer.

5. Add fuel and check for accuracy.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

FRONT AND REAR DRAIN HOSES REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Sealing compound (WP 0153, Item 17)
Nut, self-locking, hex (WP 0154, Item 16) (5)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0125

Equipment Condition

TRM shut down (WP 0022)

REMOVAL

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Remove front drain hose (Figure 1, Item 24).
   a. Verify shutoff valve (Figure 1, Item 3) is in the closed position.
   b. Remove three locknuts (Figure 1, Item 22) and loop clamps (Figure 1, Item 23) securing front drain hose (Figure 1, Item 24) to tank assembly (Figure 1, Item 7). Discard locknuts.
   c. Loosen hose clamp (Figure 1, Item 1) securing front drain hose (Figure 1, Item 24) to hose barb (Figure 1, Item 2) on shutoff valve (Figure 1, Item 3).
   d. Remove front drain hose (Figure 1, Item 24) from hose barb (Figure 1, Item 2).
   e. Remove hose clamp (Figure 1, Item 1) from front drain hose (Figure 1, Item 24).
   f. Rotate pipe elbow (Figure 1, Item 5) upward to allow access to remove drain valve (Figure 1, Item 3).
   g. Remove drain valve (Figure 1, Item 3) from pipe nipple (Figure 1, Item 4).
   h. Remove pipe nipple (Figure 1, Item 4) from pipe elbow (Figure 1, Item 5).
   i. Remove pipe elbow (Figure 1, Item 5) from pipe nipple (Figure 1, Item 6).
   j. Remove pipe nipple (Figure 1, Item 6) and bushing (Figure 1, Item 8) from tank assembly (Figure 1, Item 7).
   k. Remove hose barb (Figure 1, Item 2) from drain valve (Figure 1, Item 3).
2. Remove upper rear drain hose (Figure 1, Item 13).
   a. Verify shutoff valve (Figure 1, Item 16) is in the closed position.
   b. Loosen two hose clamps (Figure 1, Items 12 and 14) securing upper rear drain hose (Figure 1, Item 13) to hose barbs (Figure 1, Items 11 and 15).
   c. Remove upper rear drain hose (Figure 1, Item 13) from hose barbs (Figure 1, Items 11 and 15).
   d. Remove hose clamps (Figure 1, Items 12 and 14) from upper rear drain hose (Figure 1, Item 13).
   e. If necessary, remove hose barb (Figure 1, Item 11) from bushing (Figure 1, Item 10) on tank assembly (Figure 1, Item 9).
3. Remove lower rear drain hose (Figure 1, Item 21) and shutoff valve (Figure 1, Item 16).
   a. Loosen hose clamp (Figure 1, Item 18) securing lower rear drain hose (Figure 1, Item 21) to hose barb (Figure 1, Item 17) on shutoff valve (Figure 1, Item 16).
   b. Remove two locknuts (Figure 1, Item 19) securing lower drain hose (Figure 1, Item 21) and two loop clamps (Figure 1, Item 20) to tank assembly (Figure 1, Item 9). Discard locknuts.
   c. Remove lower rear drain hose (Figure 1, Item 21) from hose barb (Figure 1, Item 17).
   d. Remove hose clamp (Figure 1, Item 18) from lower rear drain hose (Figure 1, Item 21).
   e. Remove two screws (Figure 1, Item 25) securing shutoff valve (Figure 1, Item 16).
   f. Remove shutoff valve (Figure 1, Item 16).
   g. Remove hose barbs (Figure 1, Items 15 and 17) from shutoff valve (Figure 1, Item 16).

REMOVAL – CONTINUED

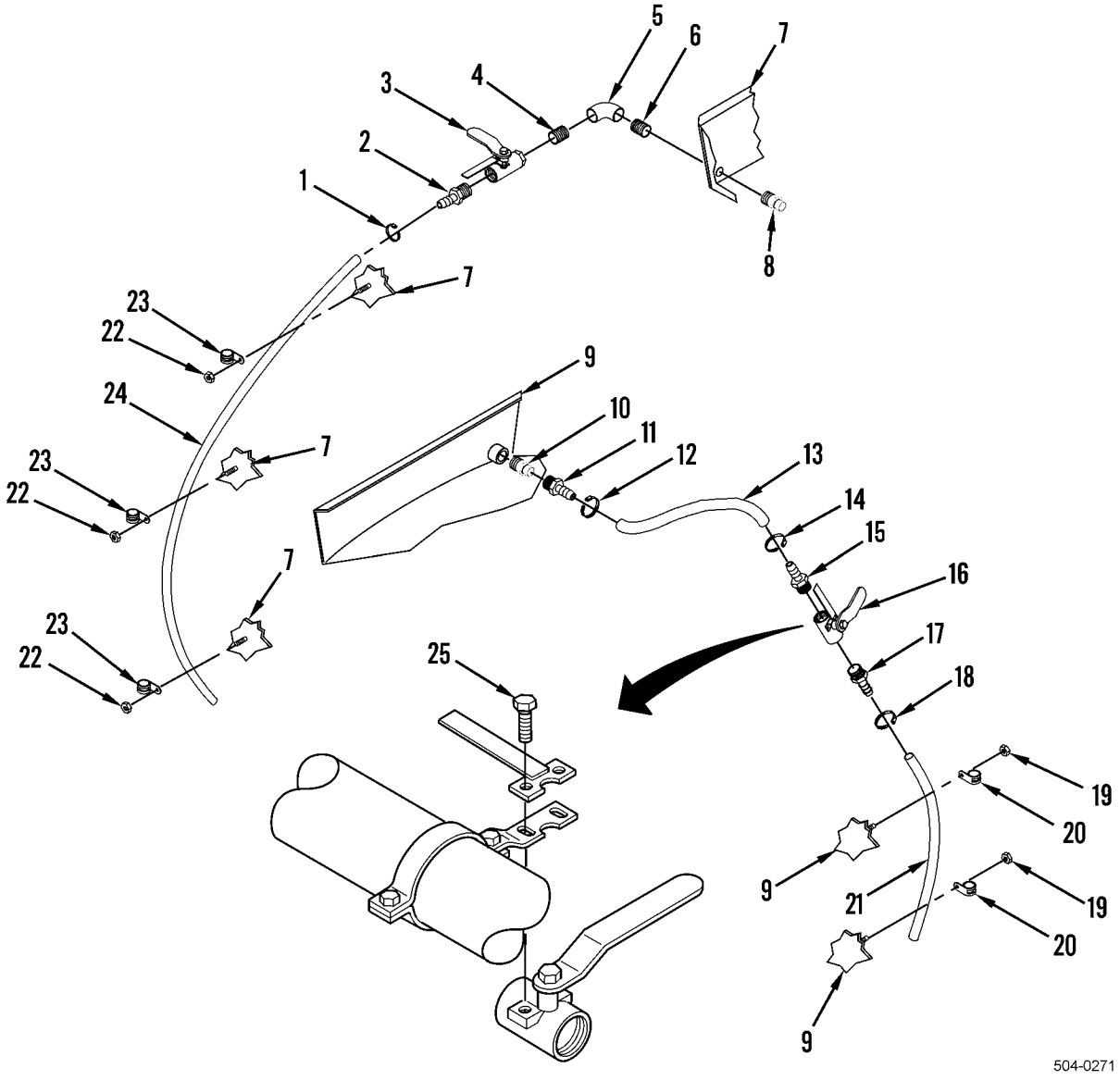


Figure 1. Front and Rear Drain Hoses.

END OF TASK

INSTALLATION

WARNING

Goggles and gloves must be worn when working with sealing compound. Avoid contact with eyes and skin. Avoid breathing of vapors and ensure there is adequate ventilation. If sealing compound contacts eyes, flush with cold water for at least 15 minutes and seek immediate medical attention. If sealing compound contacts skin, wash skin thoroughly with soap and water. Failure to comply could result in injury to personnel.

NOTE

Apply sealing compound to all threaded mating surfaces.

1. Install lower rear drain hose (Figure 2, Item 21) and shutoff valve (Figure 2, Item 16).
   a. Apply sealing compound to threads of hose barbs (Figure 2, Item 15 and 17) and install hose barbs into shutoff valve (Figure 2, Item 16).
   b. Position shutoff valve (Figure 2, Item 16) and install two screws (Figure 2, Item 25).
   c. Install hose clamp (Figure 2, Item 18) on lower rear drain hose (Figure 2, Item 21).
   d. Install lower rear drain hose (Figure 2, Item 21) on hose barb (Figure 2, Item 17) and tighten clamp (Figure 2, Item 18).
   e. Install two loop clamps (Figure 2, Item 20) on lower rear drain hose (Figure 2, Item 21).
   f. Position lower rear drain hose (Figure 2, Item 21) and two loop clamps (Figure 2, Item 20) on tank assembly (Figure 2, Item 9) and secure with two new locknuts (Figure 2, Item 19).
2. Install upper rear drain hose (Figure 2, Item 13).
   a. If removed, apply sealing compound to threads of hose barb (Figure 2, Item 15) and install hose barb into bushing (Figure 2, Item 10) on tank assembly (Figure 2, Item 9).
   b. Install two hose clamps (Figure 2, Items 14 and 12) on upper rear drain hose (Figure 2, Item 13).
   c. Install upper rear drain hose (Figure 2, Item 13) on hose barb (Figure 2, Item 11).
   d. Install other end of upper rear drain hose (Figure 2, Item 13) on hose barb (Figure 2, Item 15).
   e. Tighten two hose clamps (Figure 2, Items 14 and 12) to secure upper rear drain hose (Figure 2, Item 13)
3. Install front drain hose (Figure 2, Item 24).
   a. Apply sealing compound to threads of pipe nipple (Figure 2, Item 6) and install pipe nipple into bushing (Figure 2, Item 8).
   b. Apply sealing compound to threads of pipe nipple (Figure 2, Item 6) and install pipe elbow (Figure 2, Item 5) onto pipe nipple.

WARNING

Goggles and gloves must be worn when working with sealing compound. Avoid contact with eyes and skin. Avoid breathing of vapors and ensure there is adequate ventilation. If sealing compound contacts eyes, flush with cold water for at least 15 minutes and seek immediate medical attention. If sealing compound contacts skin, wash skin thoroughly with soap and water. Failure to comply could result in injury to personnel.

   c. Apply sealing compound to threads of nipple (Figure 2, Item 6) and install elbow (Figure 2, Item 5) with nipple (Figure 2, Item 6) on tank assembly (Figure 2, Item 7).
   d. Apply sealing compound to threads of pipe nipple (Figure 2, Item 4) and install pipe nipple into pipe elbow (Figure 2, Item 5).

INSTALLATION – CONTINUED

e. Apply sealing compound to threads of hose barb (Figure 2, Item 2) and install hose barb into shutoff valve (Figure 2, Item 3).

f. Apply sealing compound to threads of pipe nipple (Figure 2, Item 4) and install shutoff valve (Figure 2, Item 3) on elbow (Figure 2, Item 5).

g. Install hose clamp (Figure 2, Item 1) on front drain hose (Figure 2, Item 24).

h. Install front drain hose (Figure 2, Item 24) on hose barb (Figure 2, Item 2) and tighten hose clamp (Figure 2, Item 1).

i. Install three loop clamps (Figure 2, Item 23) on front drain hose (Figure 2, Item 24).

j. Position front drain hose (Figure 2, Item 24) and loop clamps (Figure 2, Item 23) on tank assembly (Figure 2, Item 7) and secure with three new locknuts (Figure 2, Item 22).

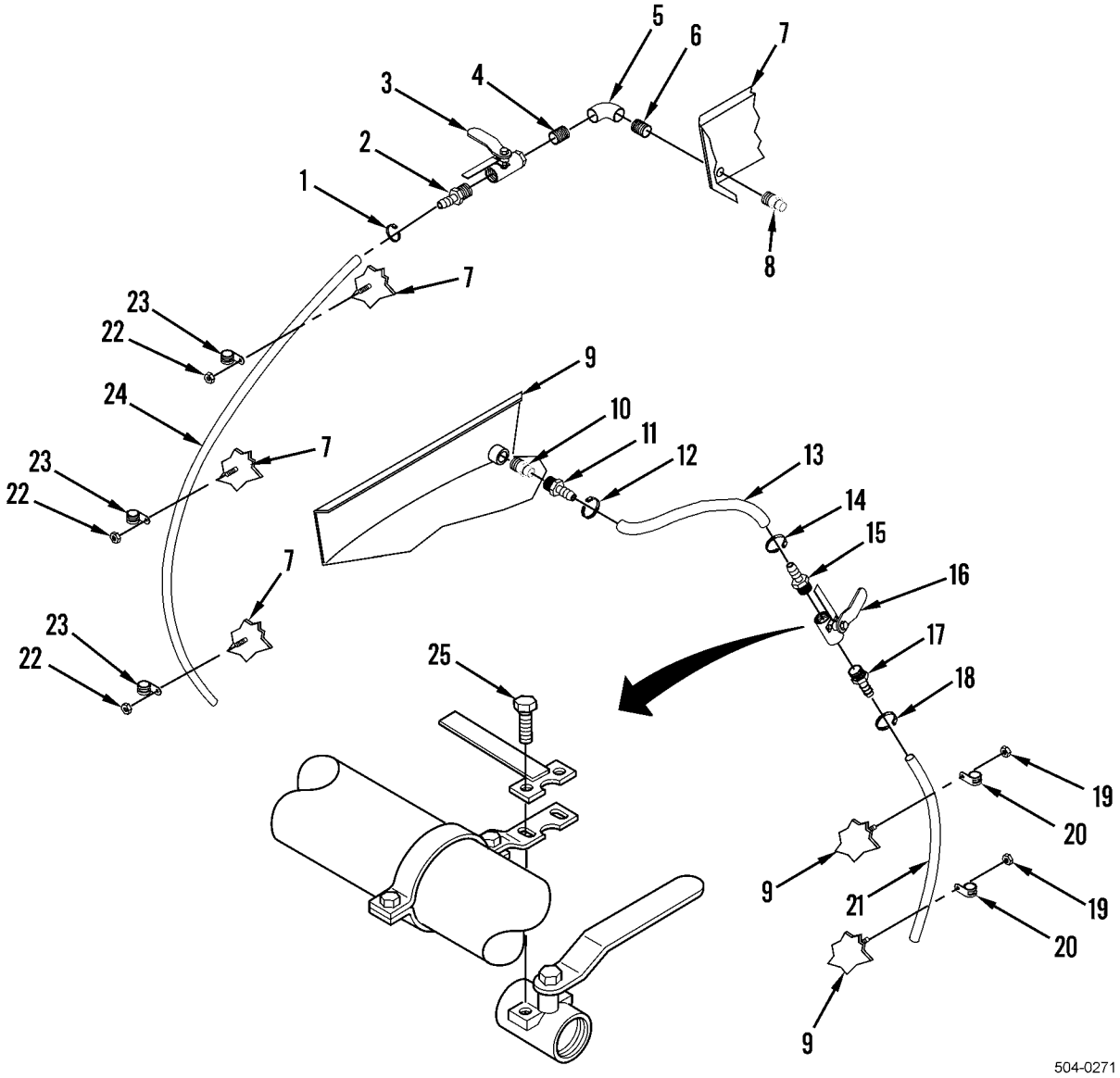


Figure 2. Front and Rear Drain Hoses.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

VENT VALVE ASSEMBLY REPAIR
Disassembly, Clean, Assembly

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)
Knife, putty (WP 0152, Table 2, Item 3)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pin, cotter (WP 0154, Item 23)
Gasket (WP 0154, Item 3)
Nut, self-locking, hex (WP 0154, Item 17) (8)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

WP 0126

Equipment Condition

TRM shut down (WP 0022)
TRM drained (WP 0017)

DISASSEMBLY

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

DISASSEMBLY – CONTINUED

1. Open manhole cover to relieve pressure.
2. Remove loop clamp (Figure 1, Item 4) securing vent hood (Figure 1, Item 1) to vent valve (Figure 1, Item 5).
3. Loosen hose clamp (Figure 1, Item 2) securing vent hood (Figure 1, Item 1) to vapor recovery piping assembly (Figure 1, Item 3).
4. Slide hose clamp (Figure 1, Item 2) onto vapor recovery piping assembly (Figure 1, Item 3).
5. Remove vent hood (Figure 1, Item 1).
6. If required, remove plug and hood clamp.
   a. Remove clamp (Figure 1, Item 17) from vent hood (Figure 1, Item 1).
   b. Remove plug (Figure 1, Item 16) from vent hood (Figure 1, Item 1).

NOTE

Two old locknuts are used in installation for alignment purposes.

7. Remove eight locknuts (Figure 1, Item 15). Discard six locknuts.
8. Lift vent valve (Figure 1, Item 5) from studs (Figure 1, Item 13).
9. Remove gasket (Figure 1, Item 7) from tank assembly (Figure 1, Item 8) and discard gasket.
10. Measure and record distance between bottom of vent valve (Figure 1, Item 5) spring and top of socket (Figure 1, Item 10).
11. Remove cotter pin (Figure 1, Item 9) from socket (Figure 1, Item 10) and discard cotter pin.
12. Remove push rod (Figure 1, Item 12) from socket (Figure 1, Item 10).
13. Remove plug button (Figure 1, Item 11) from push rod (Figure 1, Item 12).
14. Loosen jamnut (Figure 1, Item 14) and remove socket (Figure 1, Item 10) from vent valve (Figure 1, Item 5).
15. Remove jamnut (Figure 1, Item 14) from threaded rod (Figure 1, Item 6) on vent valve (Figure 1, Item 5).

DISASSEMBLY – CONTINUED

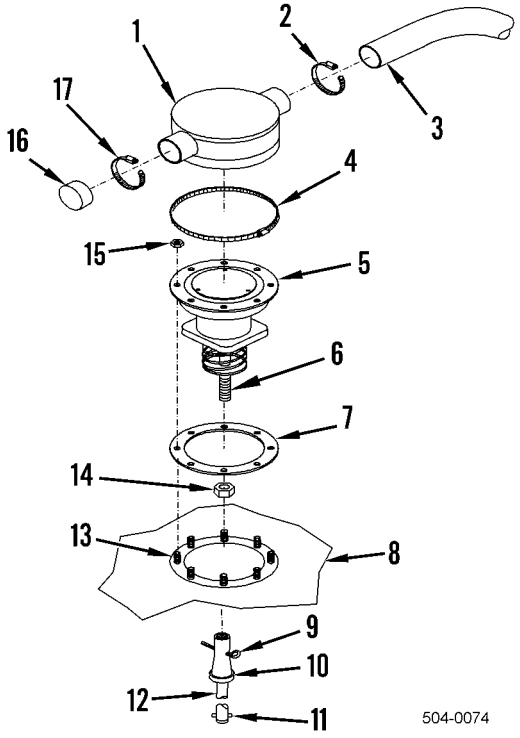


Figure 1. Vent Hood and Vapor Recovery Piping Assembly.

END OF TASK

CLEAN

WARNING

Wear goggles to prevent foreign objects from entering your eyes. Failure to comply could result in eye injury.

1. Clean any gasket debris from mating surfaces.
2. Using cleaning cloth, wipe up any spilled fuel and dispose of per local procedures.

END OF TASK

ASSEMBLY

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

1. Install jamnut (Figure 2, Item 14) on threaded rod (Figure 2, Item 6) to vent valve (Figure 2, Item 5).
2. Install socket (Figure 2, Item 10) on threaded rod (Figure 2, Item 6) to vent valve (Figure 2, Item 5).
3. Install cotter pin (Figure 2, Item 9) through socket Figure 2, Item 10) and push rod (Figure 2, Item 12).
4. Install plug button (Figure 2, Item 11) on push rod (Figure 2, Item 12).
5. Position push rod (Figure 2, Item 12) into socket (Figure 2, Item 10).
6. Turn push rod (Figure 2, Item 12) clockwise to decrease measurement or counterclockwise to increase measurement to match distance recorded during removal.
7. Tighten jamnut (Figure 2, Item 14) on threaded rod (Figure 2, Item 6) until it locks on socket (Figure 2, Item 6).
8. Install new gasket (Figure 2, Item 7) on studs (Figure 2, Item 13) to tank assembly (Figure 2, Item 8).
9. Slowly install and align plug button (Figure 2, Item 11) with V2 valve center piston (Figure 3, Item 18).
10. Align vent valve (Figure 2, Item 5) with position marked during removal and with studs (Figure 2, Item 13).
11. Install two old locknuts (Figure 2, Item 15) snugly across from each other on studs (Figure 2, Item 13) and vent valve (Figure 2, Item 5) to tank assembly (Figure 1, Item 8).
12. Tighten locknuts (Figure 2, Item 15) securing vent valve (Figure 2, Item 5) to tank assembly (Figure 2, Item 8).
13. Have assistant open and close V2 valve while observing vent valve (Figure 2, Item 5).

NOTE

The vent valve should open and close, confirming the vent valve is properly aligned with internal valve center piston. If vent valve does not open and close, repeat steps 10 thru 14 until vent valve opens and closes properly.

14. Install six new locknuts (Figure 2, Item 15) on studs (Figure 2, Item 13) to tank assembly (Figure 2, Item 8). Tighten new locknuts.
15. Remove two old locknuts (Figure 2, Item 15) and discard.
16. Install two remaining new locknuts (Figure 2, Item 15) on studs (Figure 2, Item 13) to vent valve (Figure 2, Item 5), and tank assembly (Figure 2, Item 8).

ASSEMBLY – CONTINUED

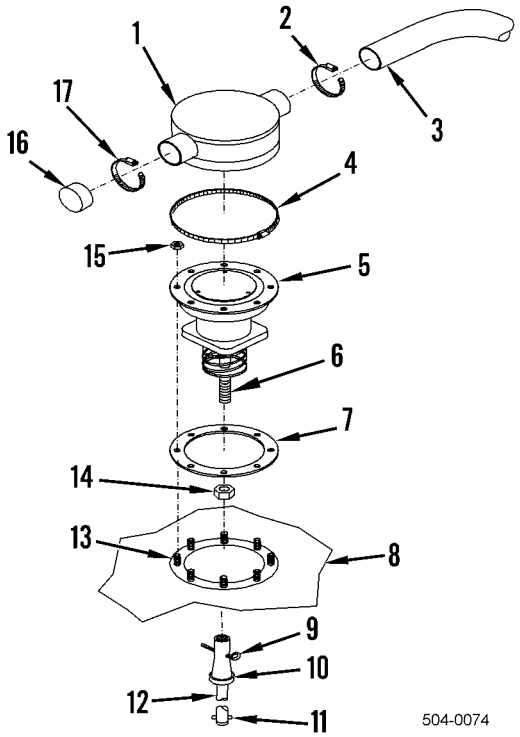


Figure 2. Vent Hood and Vapor Recovery Piping Assembly.

ASSEMBLY – CONTINUED

17. Install plug and hood clamp.
    a. Insert plug (Figure 3, Item 16) in vent hood (Figure 3, Item 1).
    b. Install hood clamp (Figure 3, Item 17) on vent hood (Figure 3, Item 1).
18. Install vent hood (Figure 3, Item 1) to vent valve (Figure 3, Item 5) and connect vapor recovery piping (Figure 3, Item 3) to vent hood (Figure 3, Item 1).
19. Install loop clamp (Figure 3, Item 4) on vent hood (Figure 3, Item 1) and tighten to secure to vent valve (Figure 3, Item 5).
20. Slide clamp (Figure 3, Item 2) from vapor recovery piping (Figure 3, Item 3) on vent hood (Figure 3, Item 1). Tighten clamp (Figure 3, Item 2).

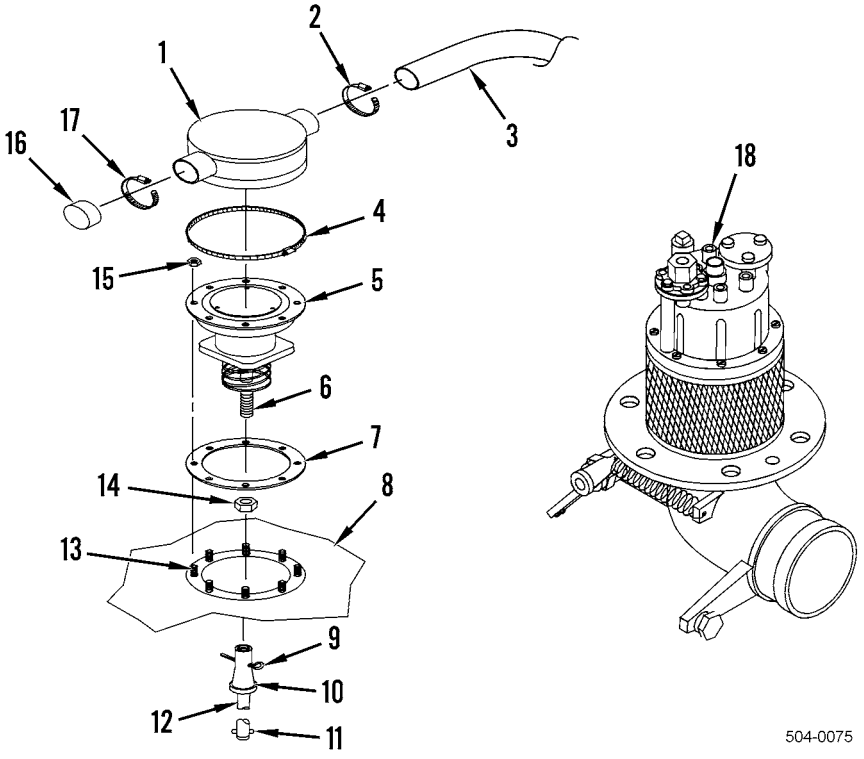


Figure 3. Vent Hood, Vapor Recovery Piping Assembly, and V2 Valve.

21. Close manhole cover.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

VAPOR RECOVERY PIPING ASSEMBLY REPAIR
Disassembly, Assembly

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Nut, self-locking, hex (WP 0154, Item 18) (4)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0127

Equipment Condition

TRM shut down (WP 0022)

DISASSEMBLY

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

DISASSEMBLY – CONTINUED

1. Open manhole cover to relieve pressure.
2. Remove dust cap (Figure 1, Item 8) from vapor recovery piping (Figure 1, Item 5).
3. Remove hose clamp (Figure 1, Item 6) securing vapor recovery piping (Figure 1, Item 5) to vent hood (Figure 1, Item 7).

NOTE

To aid in removal, it may be necessary to remove two screws holding drain valve.

4. Remove two locknuts (Figure 1, Item 4), screws (Figure 1, Item 1) and pipe strap (Figure 1, Item 2) securing vapor recovery piping (Figure 1, Item 5) to top mounting bracket (Figure 1, Item 3). Discard locknuts.
5. Remove two locknuts (Figure 1, Item 9), screws (Figure 1, Item 10), and four washers (Figure 1, Item 11) securing vapor recovery piping (Figure 1, Item 5) to side mounting bracket (Figure 1, Item 12). Discard locknuts.
6. Remove vapor recovery piping (Figure 1, Item 5).

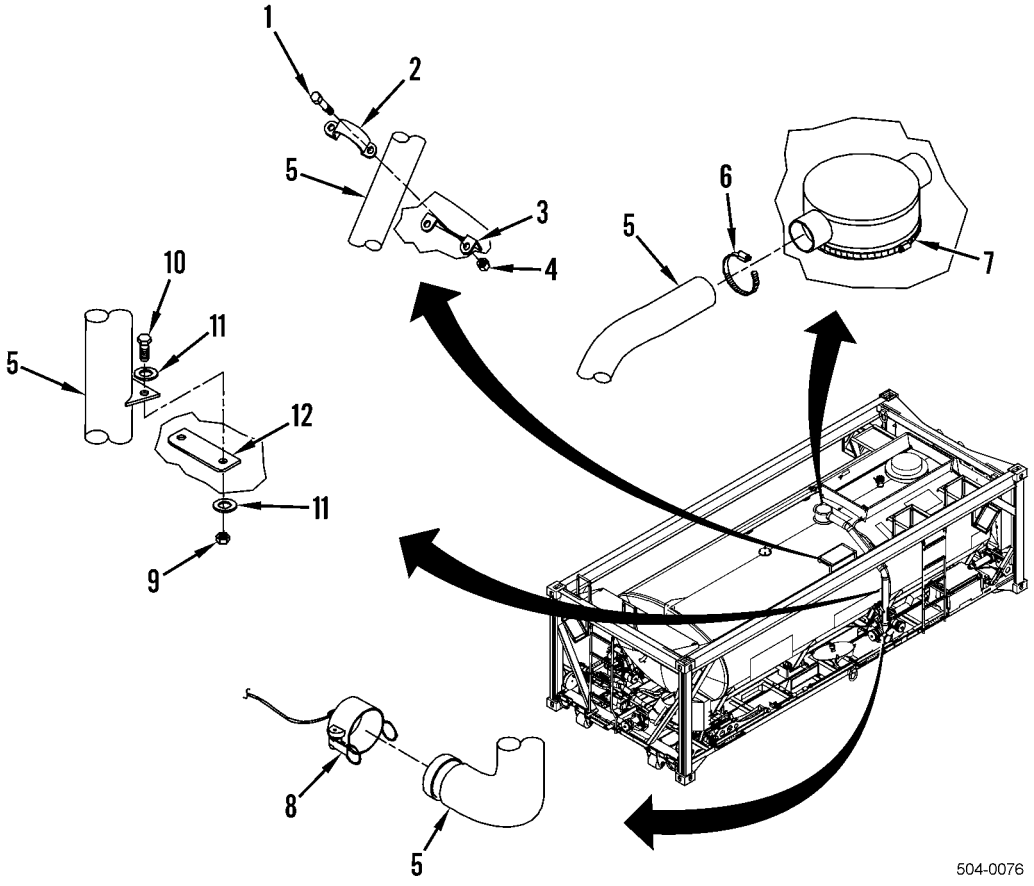


Figure 1. Vapor Recovery Piping Assembly.

END OF TASK

ASSEMBLY

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

1. Position vapor recovery piping (Figure 1, Item 5) on side mounting bracket (Figure 1, Item 12), top mounting bracket (Figure 1, Item 3), and vent hood (Figure 1, Item 7).
2. Install two screws (Figure 1, Item 10), four washers (Figure 1, Item 11), and two new locknuts (Figure 1, Item 9) to secure vapor recovery piping (Figure 1, Item 5) to side mounting bracket (Figure 1, Item 12).
3. Install top mounting strap (Figure 1, Item 2), two screws (Figure 1, Item 1), and two new locknuts (Figure 1, Item 4) to secure vapor recovery piping (Figure 1, Item 5) to top mounting bracket (Figure 1, Item 3).

NOTE

If removed, install two screws holding drain valve.

4. Position hose clamp (Figure 1, Item 6) on vapor recovery piping (Figure 1, Item 5).
5. Install vapor recovery piping (Figure 1, Item 5) to vent hood (Figure 1, Item 7). Tighten hose clamp (Figure 1, Item 6).
6. Install dust cap (Figure 1, Item 8) on vapor recovery piping (Figure 1, Item 5).
7. Close manhole cover.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

LIQUID LEVEL SWITCH REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Respirator, air filtering (WP 0153, Item 16)
Sealing compound (WP 0153, Item 17)
Washer, lock (WP 0154, Item 34) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

WP 0128

Equipment Condition

TRM shut down (WP 0022)
TRM drained (WP 0017)
Manhole cover removed (WP 0040)

REMOVAL

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Disconnect blue fuel line (Figure 1, Item 14) from outlet elbow (Figure 1, Item 3) on pressure sensor (Figure 1, Item 6).
2. Disconnect clear precheck valve line (Figure 1, Item 4) from adapter (Figure 1, Item 5) on pressure sensor (Figure 1, Item 6).
3. Disconnect red line (Figure 1, Item 10) from inlet elbow (Figure 1, Item 9) on pressure sensor (Figure 1, Item 6).
4. Mark position of lower jamnut (Figure 1, Item 11) on threaded rod (Figure 1, Item 12) to aid in installation.

CAUTION

Use two wrenches to loosen jamnut from threaded rod on liquid level switch. Failure to comply could result in damage to equipment.

5. Using two wrenches, hold lower jamnut (Figure 1, Item 11) steady and rotate upper wrench counterclockwise until upper jamnut (Figure 1, Item 1) is loosened.

NOTE

Secure rubber hose to prevent from dropping into tank.

6. Loosen hose clamp (Figure 1, Item 7) and remove rubber hose (Figure 1, Item 8) from pressure sensor (Figure 1, Item 6).
7. Hold pressure sensor (Figure 1, Item 6) and remove upper jamnut (Figure 1, Item 1) and lockwasher (Figure 1, Item 2) from threaded rod (Figure 1, Item 12). Discard lockwasher.
8. Remove threaded rod (Figure 1, Item 12) with pressure sensor (Figure 1, Item 6) and lockwasher (Figure 1, Item 13) from bracket (Figure 1, Item 15). Discard lockwasher.
9. Remove inlet elbow (Figure 1, Item 9), outlet elbow (Figure 1, Item 3), and adapter (Figure 1, Item 5) from pressure sensor (Figure 1, Item 6).
10. Remove sealant from inlet elbow (Figure 1, Item 9), outlet elbow (Figure 1, Item 3), and adapter (Figure 1, Item 5).
11. Remove lower jamnut (Figure 1, Item 11) from threaded rod (Figure 1, Item 12).

REMOVAL – CONTINUED

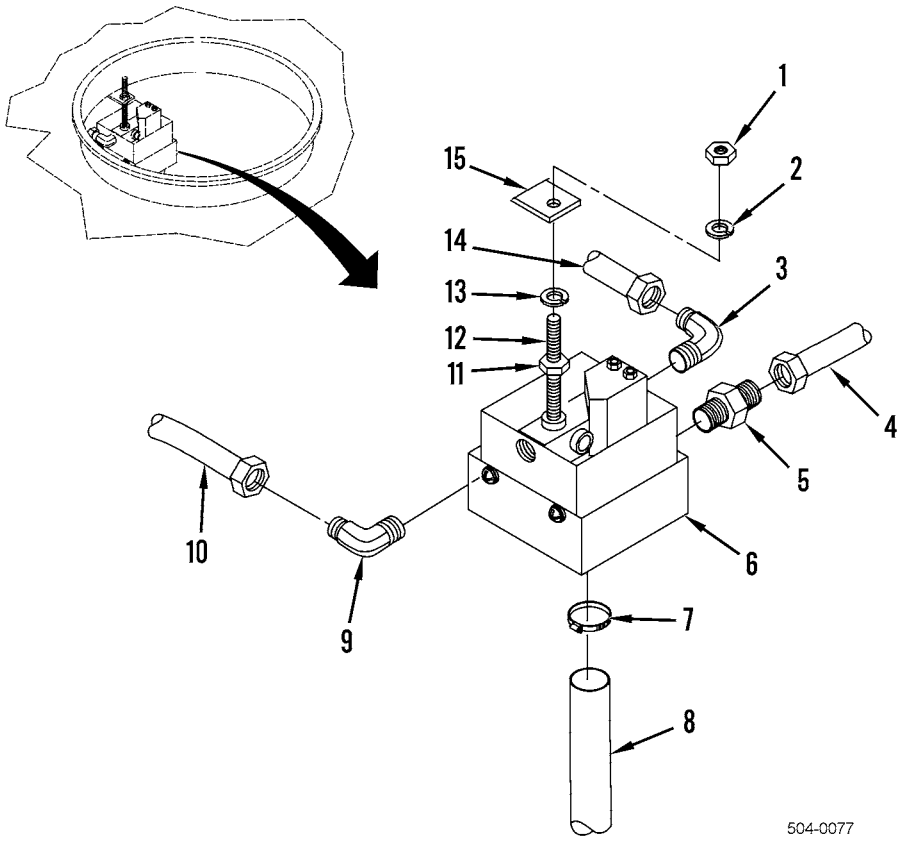
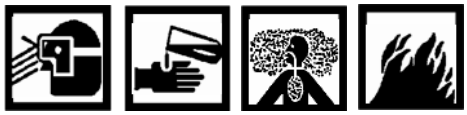


Figure 1. Liquid Level Switch.

END OF TASK

INSTALLATION

WARNING



- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.
- Goggles and gloves must be worn when working with sealing compound. Avoid contact with eyes and skin. Avoid breathing vapors and ensure there is adequate ventilation. If sealing compound contacts eyes, flush eyes with cold water for at least 15 minutes and seek immediate medical attention. If sealing compound contacts skin, wash skin thoroughly with soap and water. Failure to comply could result in injury to personnel.

1. Apply sealing compound to threaded ends of inlet elbow (Figure 2, Item 9), outlet elbow (Figure 2, Item 3), and adapter (Figure 2, Item 5).
2. Install inlet elbow (Figure 2, Item 9), outlet elbow (Figure 2, Item 3) and adapter (Figure 2, Item 5) on pressure sensor (Figure 2, Item 6).

NOTE

Mark new rod with position previously marked on old rod.

3. Install lower jamnut (Figure 2, Item 11) and new lockwasher (Figure 2, Item 13) to previously marked position on threaded rod (Figure 2, Item 12).
4. Insert threaded rod (Figure 2, Item 12) with new lockwasher (Figure 2, Item 2) into bracket (Figure 2, Item 15) and install and hand tighten upper jamnut (Figure 2, Item 1).
5. Position pressure sensor (Figure 2, Item 6) with center of inlet elbow (Figure 2, Item 9) 43 in. (109.22 cm) from bottom of tank.

CAUTION

Use two wrenches to tighten jamnuts on threaded rod. Failure to comply could result in damage to equipment.

6. Using two wrenches, hold lower jamnut (Figure 2, Item 11) steady and rotate upper jamnut (Figure 2, Item 1) clockwise until tightened.
7. Install hose (Figure 2, Item 8) on pressure sensor (Figure 2, Item 6) and tighten hose clamp (Figure 2, Item 7).
8. Install clear precheck valve line (Figure 2, Item 4) on adapter (Figure 2, Item 5) and tighten.
9. Install blue fuel line (Figure 2, Item 14) on outlet fitting (Figure 2, Item 3) of pressure sensor (Figure 2, Item 6) and tighten.
10. Install red fuel line (Figure 2, Item 10) on inlet elbow (Figure 2, Item 9) of pressure sensor (Figure 2, Item 6) and tighten.

INSTALLATION – CONTINUED

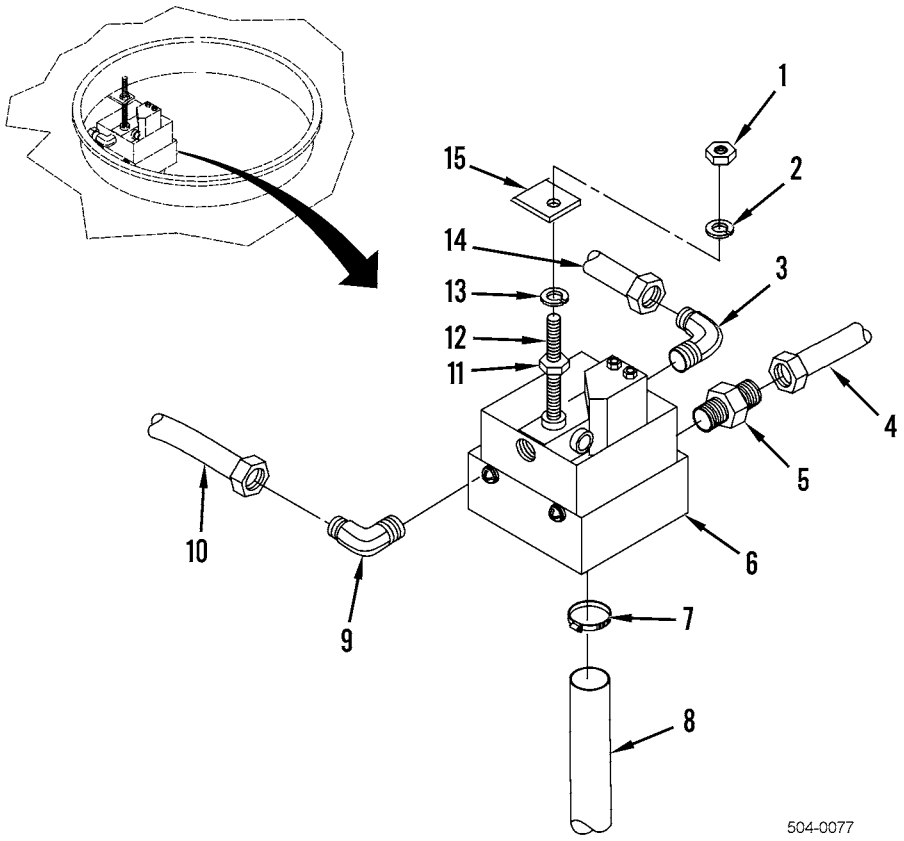


Figure 2. Liquid Level Switch.

11. Install manhole cover (WP 0040).
12. Add fuel to TRM (WP 0017).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

STOWAGE TUBE ASSEMBLY REPAIR
Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Splice compression tool (WP 0151, Item 4)

Materials/Parts

Nut, self-locking, hex (WP 0154, Item 18) (4)
Rope, wire (WP 0154, Item 28) (2)
Sleeve stop (WP 0154, Item 31) (4)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

WP 0129

Equipment Condition

TRM shut down (WP 0022)
Gauge stick removed

REMOVAL

Remove four locknuts (Figure 1, Item 1), screws (Figure 1, Item 3), eight washers (Figure 1, Item 4), and stowage tube assembly (Figure 1, Item 2). Discard locknuts.

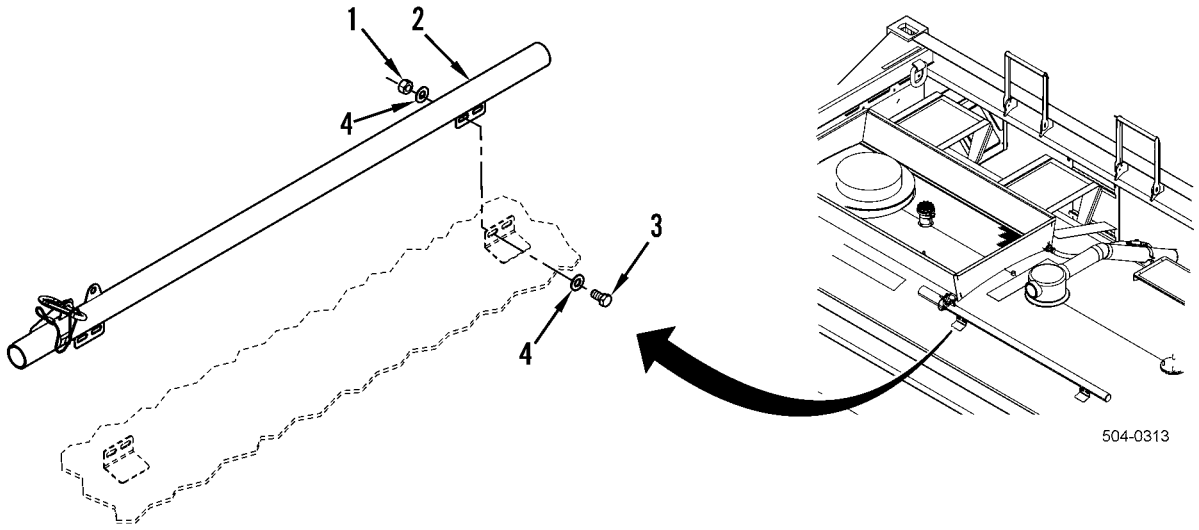


Figure 1. Stowage Tube Assembly.

END OF TASK

DISASSEMBLY

1. Remove four sleeve stops (Figure 2, Item 3), two wire ropes (Figure 2, Item 1), and spring snap clip (Figure 2, Item 2). Discard sleeve stops and wire rope.
2. Remove cover (Figure 2, Item 5) from tube (Figure 2, Item 4).

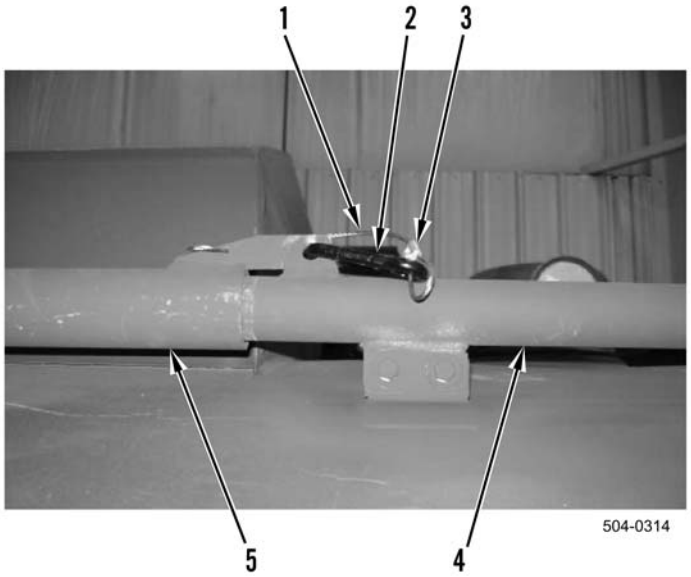


Figure 2. Stowage Tube Assembly.

END OF TASK

ASSEMBLY

1. Install cover (Figure 2, Item 5) on tube (Figure 2, Item 4).
2. Install four new sleeve stops (Figure 2, Item 3), two new wire ropes (Figure 2, Item 1), and spring snap clip (Figure 2, Item 2).

END OF TASK

INSTALLATION

1. Install stowage tube assembly (Figure 3, Item 2), eight washers (Figure 3, Item 4), four screws (Figure 3, Item 3), and new locknuts (Figure 3, Item 1).

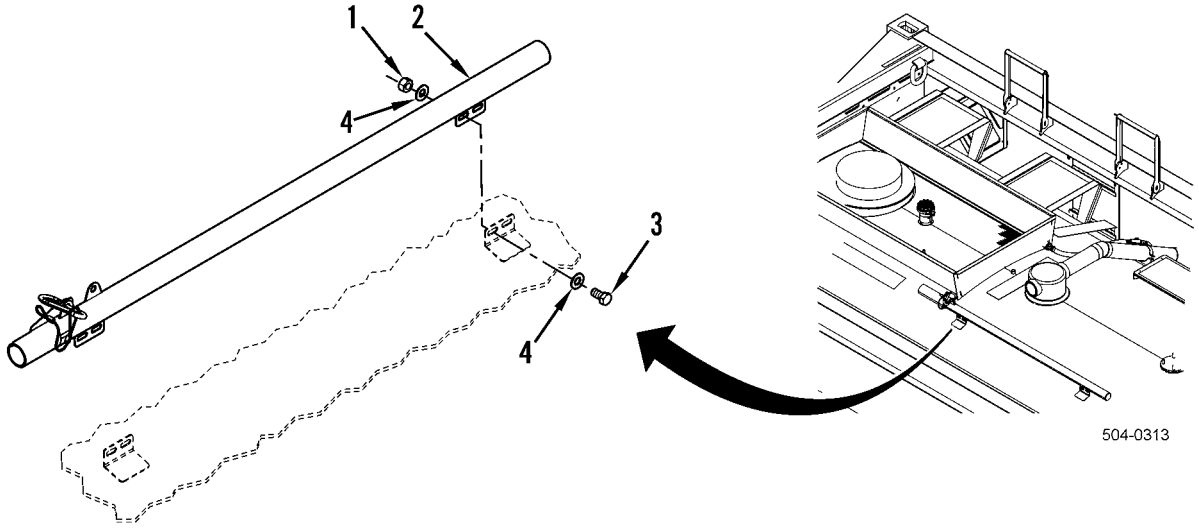


Figure 3. Stowage Tube Assembly.

2. Install gauge stick.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

DISCHARGE PIPING ASSEMBLY REPAIR
Disassembly, Assembly

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)
Petrolatum, technical (WP 0153, Item 15)
Nut, self-locking, hex (WP 0154, Item 16) (4)
Nut, self-locking, hex (WP 0154, Item 18) (4)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

WP 0071
WP 0130

Equipment Condition

TRM shut down (WP 0021)
TRM drained (WP 0017)
TRM mounted on PLS trailer (WP 0013)
Battery box lid removed (WP 0033)
Battery negative cable removed (WP 0056-2, steps 1 - 3)

DISASSEMBLY

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

Upper Discharge Piping Assembly

1. Place drip pan beneath upper discharge pipe (Figure 1, Item 6) and two 2 in. (5.08 cm) fuel hoses (Figure 1, Items 11 and 15).
2. Loosen two clamps (Figure 1, Items 10 and 14) securing two 2 in. (5.08 cm) hoses (Figure 1, Items 11 and 15) on two straight pipe adapters (Figure 1, Item 9).
3. Remove two 2 in. (5.08 cm) hoses (Figure 1, Items 11 and 15) from straight pipe adapters (Figure 1, Item 9) and drain contents into drip pan.
4. Remove two locknuts (Figure 1, Item 16), and screws (Figure 1, Item 4) from coupling (Figure 1, Item 5). Discard locknuts.
5. Remove coupling (Figure 1, Item 5) securing upper discharge pipe (Figure 1, Item 6) to lower discharge pipe (Figure 1, Item 3).
6. Remove slide gasket (Figure 1, Item 17) from lower discharge pipe (Figure 1, Item 3).
7. Remove two bolts (Figure 1, Item 7) and two locknuts (Figure 1, Item 13) securing strap (Figure 1, Item 8) to mounting bracket (Figure 1, Item 12). Discard locknuts.
8. Remove strap (Figure 1, Item 8) from upper discharge pipe (Figure 1, Item 6).
9. Remove upper discharge pipe (Figure 1, Item 6) from lower discharge pipe (Figure 1, Item 3).
10. If discharge piping assembly butterfly valve needs to be removed, refer to WP 0071.

Lower Discharge Piping Assembly

1. Place drip pan under pipe tee (Figure 1, Item 20) and 1 in. fuel hose (Figure 1, Item 18).
2. Loosen hose clamp (Figure 1, Item 19) securing 1 in. fuel hose (Figure 1, Item 18) to pipe tee (Figure 1, Item 20).
3. Remove 1 in. fuel hose (Figure 1, Item 18) from pipe tee (Figure 1, Item 20) and drain contents into drip pan.
4. Remove two locknuts (Figure 1, Item 21) and screws (Figure 1, Item 1) from coupling (Figure 1, Item 2). Discard locknuts.
5. Remove coupling (Figure 1, Item 2) and move slide gasket (Figure 1, Item 22) onto V1 valve (Figure 1, Item 23). Discard gasket (Figure 1, Item 22) if damaged.
6. Remove lower discharge pipe (Figure 1, Item 3) from V1 valve (Figure 1, Item 23).

DISASSEMBLY – CONTINUED

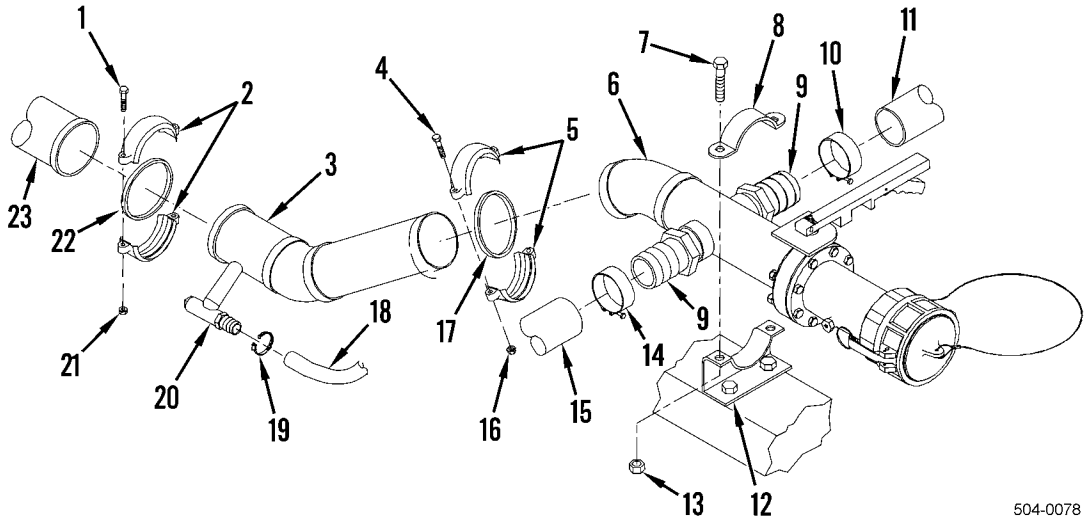
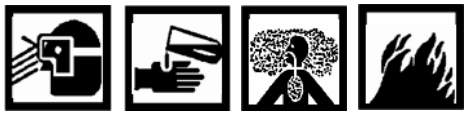


Figure 1. Discharge Piping Assembly.

END OF TASK

ASSEMBLY

WARNING



Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

Lower Discharge Piping Assembly

1. Lightly lubricate inner surface of coupling (Figure 1, Item 2) with petrolatum.
2. Position lower discharge pipe (Figure 1, Item 3) on V1 valve (Figure 1, Item 23).
3. Install coupling (Figure 1, Item 2) securing lower discharge pipe (Figure 1, Item 3) to V1 valve (Figure 1, Item 23).
   a. Install slide gasket (Figure 1, Item 22) onto lower discharge pipe (Figure 1, Item 3).
   b. Install two new locknuts (Figure 1, Item 21) and screws (Figure 1, Item 1).
4. Install 1 in. fuel hose (Figure 1, Item 18) on pipe tee (Figure 1, Item 20). Install hose clamp (Figure 1, Item 19).

ASSEMBLY – CONTINUED

Upper Discharge Piping Assembly

1. If discharge piping assembly butterfly valve was removed, refer to WP 0071.
2. Lightly lubricate inner surface of coupling (Figure 2, Item 5) with petrolatum. Position upper discharge piping assembly (Figure 2, Item 6) on mounting bracket (Figure 2, Item 12) and align other end with mating surface on lower discharge pipe (Figure 2, Item 3). Install coupling (Figure 2, Item 5) securing upper discharge pipe (Figure 2, Item 6) to lower discharge pipe (Figure 2, Item 3).
   a. Install slide gasket (Figure 2, Item 17) down lower discharge pipe (Figure 2, Item 3) and install coupling (Figure 2, Item 5).
   b. Install two new locknuts (Figure 2, Item 16) and screws (Figure 2, Item 4).
3. Install strap (Figure 2, Item 8) on upper discharge pipe (Figure 2, Item 6).
4. Install two screws (Figure 2, Item 7) and new locknuts (Figure 2, Item 13) on strap (Figure 2, Item 8) to secure upper discharge pipe (Figure 2, Item 6) to mounting bracket (Figure 2, Item 12).
5. Install two 2 in. (5.08 cm) fuel hoses (Figure 2, Items 11 and 5) on straight pipe adapters (Figure 2, Item 9). Install and tighten clamps (Figure 2, Items 10 and 14).

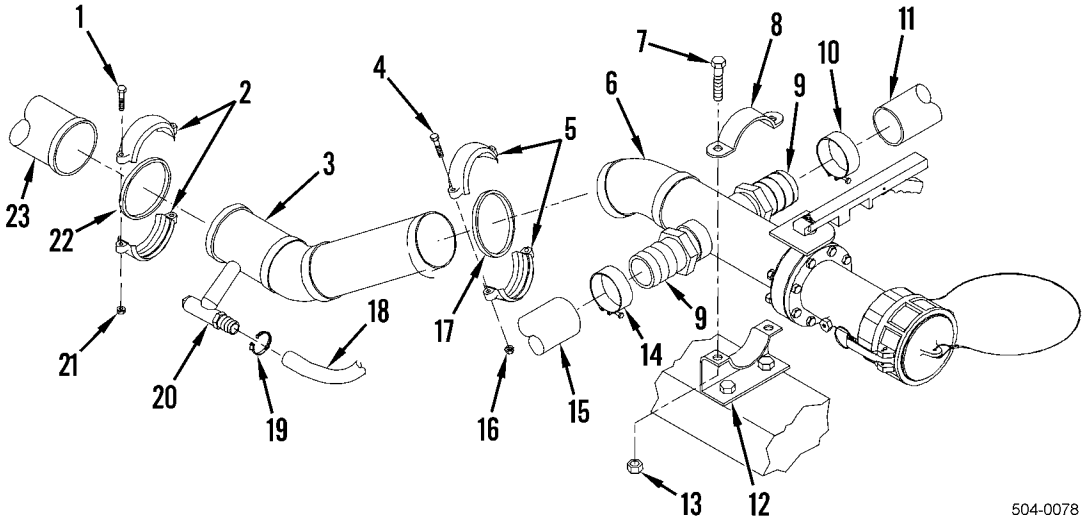


Figure 2. Discharge Piping Assembly.

6. Remove drip pan and dispose of contents per local procedures.
7. Add fuel and check for leaks.
8. Install battery negative cable (WP 0056-6, steps 15 - 20).
9. Install battery box lid (WP 0033).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

PORT C PLUG AND VACUUM BREAKER REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)
Sealing compound (WP 0153, Item 17)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0130

Equipment Condition

TRM shut down (WP 0021)
V7 Discharge port C control valve closed
Fuel drained from port C vacuum breaker

REMOVAL

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Place drip pan under discharge piping assembly (Figure 1, Item 2).
2. Remove plug (Figure 1, Item 1) from discharge piping assembly (Figure 1, Item 2).
3. Remove nut (Figure 1, Item 5) and handle (Figure 1, Item 6) from vacuum breaker (Figure 1, Item 4).
4. Remove vacuum breaker (Figure 1, Item 4) from nipple (Figure 1, Item 3) of discharge piping (Figure 1, Item 2).

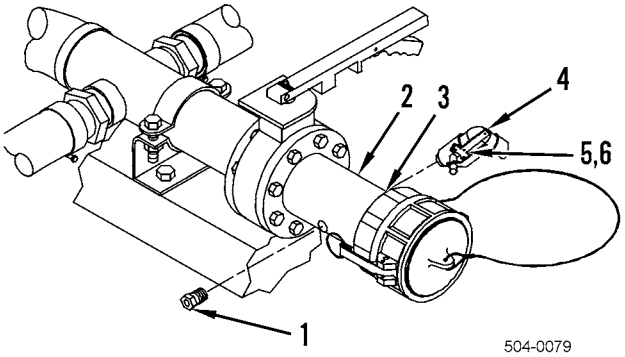


Figure 1. Port C Plug and Vacuum Breaker.

END OF TASK

INSTALLATION

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.
- Goggles and gloves must be worn when working with sealing compound. Avoid contact with eyes and skin. Avoid breathing vapors and ensure there is adequate ventilation. If sealing compound contacts eyes, flush eyes with cold water for at least 15 minutes and seek immediate medical attention. If sealing compound contacts skin, wash skin thoroughly with soap and water. Failure to comply could result in injury to personnel.

1. Apply sealing compound around threads of nipple (Figure 1, Item 3).
2. Install vacuum breaker (Figure 1, Item 4) on nipple (Figure 1, Item 3) of discharge piping (Figure 1, Item 2).
3. Install handle (Figure 1, Item 5) and nut (Figure 1, Item 4) on vacuum breaker (Figure 1, Item 4).
4. Apply sealing compound around threads of plug (Figure 1, Item 1).
5. Install plug (Figure 1, Item 1) in discharge piping (Figure 1, Item 2).
6. Remove drip pan and dispose of contents per local procedures.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

DISCHARGE PIPING ASSEMBLY BUTTERFLY VALVE REPAIR
Disassembly, Assembly

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)
Wrench, torque, 0-175 lb-ft (WP 0151, Item 7)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)
Gasket-4, flange (WP 0154, Item 5) (2)
Nut, self-locking, hex (WP 0154, Item 18) (8)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0130

Equipment Condition

TRM drained (WP 0017)

DISASSEMBLY

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Place drip pan under butterfly valve (Figure 1, Item 6).
2. Remove eight locknuts (Figure 1, Item 1) and screws (Figure 1, Item 5) securing Port C (Figure 1, Item 4) and butterfly valve (Figure 1, Item 6) to upper discharge pipe (Figure 1, Item 2). Discard locknuts.
3. Remove Port C (Figure 1, Item 4) from butterfly valve (Figure 1, Item 6).
4. Remove gasket (Figure 1, Item 3) from Port C (Figure 1, Item 4) and butterfly valve (Figure 1, Item 6) mating surfaces. Discard gasket.
5. Remove butterfly valve (Figure 1, Item 6) from upper discharge pipe (Figure 1, Item 2).
6. Remove gasket (Figure 1, Item 3) from upper discharge pipe (Figure 1, Item 2) and butterfly valve (Figure 1, Item 6). Discard gasket.
7. Remove gasket debris from Port C (Figure 1, Item 4), upper discharge pipe (Figure 1, Item 2), and butterfly valve (Figure 1, Item 6) mating surfaces.
8. Remove drip pan and dispose of contents per local procedures.

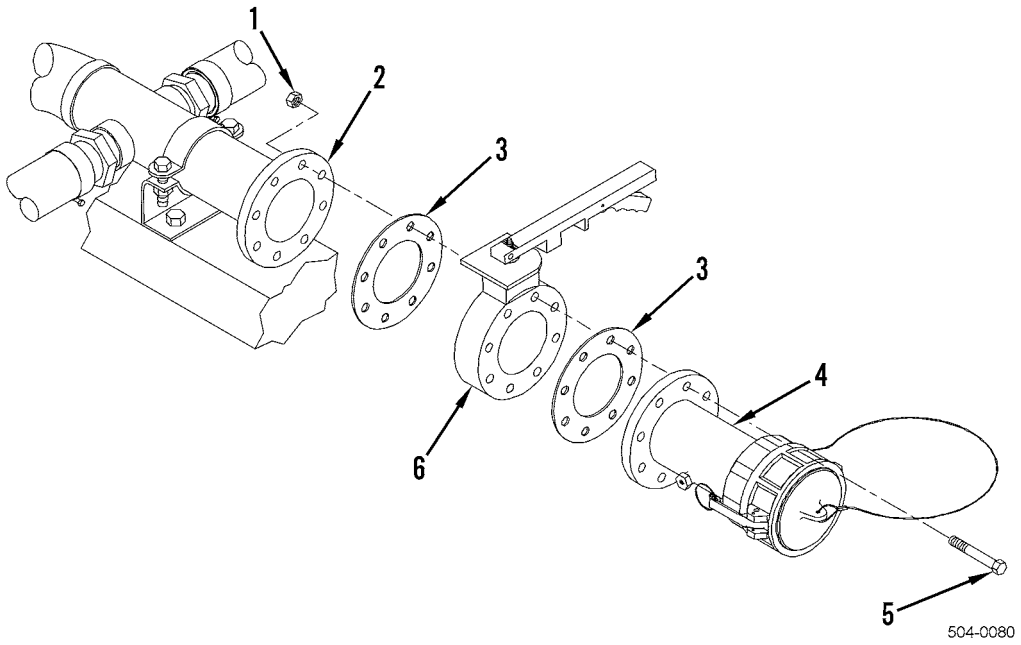


Figure 1. Discharge Piping Assembly Butterfly Valve.

END OF TASK

ASSEMBLY

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Install new gaskets (Figure 1, Item 3) on upper discharge pipe (Figure 1, Item 2) and Port C (Figure 1, Item 4).
2. Position butterfly valve (Figure 1, Item 6) and Port C (Figure 1, Item 4) on upper discharge pipe (Figure 1, Item 2) aligning all eight holes.
3. Install eight screws (Figure 1, Item 5) and new locknuts (Figure 1, Item 1).
4. Tighten eight locknuts (Figure 1, Item 1) to secure Port C (Figure 1, Item 4), butterfly valve (Figure 1, Item 6), and upper discharge pipe (Figure 1, Item 2).
5. Torque locknuts (Figure 1, Item 1) to 27-33 lb-ft (37-45 Nm).
6. Add fuel and check for leaks.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

DISCHARGE PIPING ASSEMBLY BUTTERFLY VALVE LEVER REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

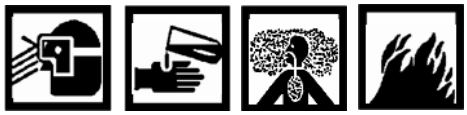
WP 0130

Equipment Condition

TRM shut down (WP 0022)

REMOVAL

WARNING



Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Remove nut (Figure 1, Item 1) and screw (Figure 1, Item 3) securing manual control lever (Figure 1, Item 2) to butterfly valve shaft (Figure 1, Item 4).
2. Remove manual control lever (Figure 1, Item 2) from butterfly valve shaft (Figure 1, Item 4).

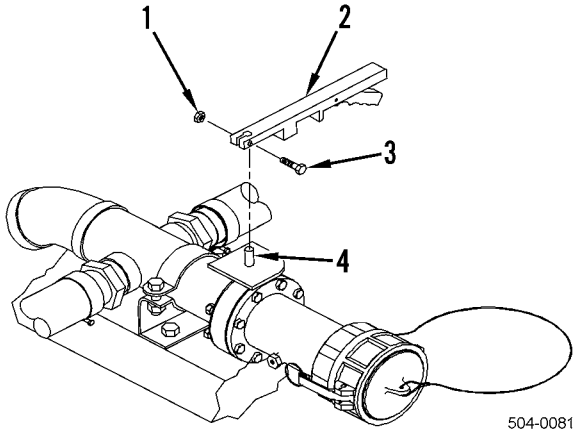


Figure 1. Butterfly Valve Manual Control Lever.

END OF TASK

INSTALLATION

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Position manual control lever (Figure 2, Item 2) on butterfly valve shaft (Figure 2, Item 4).
2. Install screw (Figure 2, Item 3) in manual control lever (Figure 2, Item 2).
3. Install nut (Figure 2, Item 1) on screw (Figure 2, Item 3).

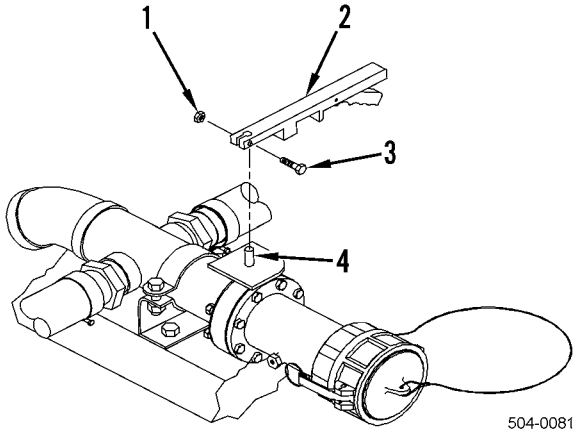


Figure 2. Butterfly Valve Manual Control Lever.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

LEFT HAND OR RIGHT HAND DISCHARGE ARM REPAIR
Removal, Disassembly, Clean, Assembly, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)
Single diameter hand tool (WP 0151, Item 3)

Materials/Parts

Cleaning compound, solvent (WP 0153, Item 2)
Cloth, cleaning (WP 0153, Item 5)
Cloth, cleaning (WP 0153, Item 5)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)
Sealing compound (WP 0153, Item 17)
Rope, wire (WP 0154, Item 29)

Materials/Parts - Continued

Seal, plain (WP 0154, Item 30)
Sleeve, swagging, wire rope (WP 0154, Item 32) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0012
WP 0131

Equipment Condition

TRM shut down (WP 0022)
V1 valve closed

REMOVAL

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

NOTE

- Ensure discharge arm has been evacuated (WP 0012).
- Place drip pan under discharge arm.

1. Place drip pan under 1 in. (2.54 cm) discharge fuel hose (Figure 1, Item 3).
2. Loosen hose clamp (Figure 1, Item 2) securing 1 in. (2.54 cm) discharge fuel hose (Figure 1, Item 3) to hose barb (Figure 1, Item 1).
3. Remove 1 in. (2.54 cm) discharge fuel hose (Figure 1, Item 3) from hose barb (Figure 1, Item 1) and drain contents into drip pan.
4. Remove hose clamp (Figure 1, Item 2) from 1 in. (2.54 cm) discharge fuel hose (Figure 1, Item 3).

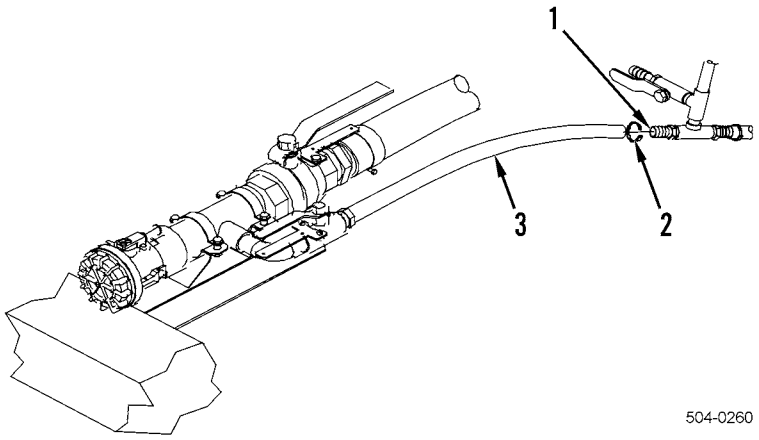


Figure 1. 1 in. (2.54 cm) Discharge Fuel Hose.

5. Reposition drip pan under 2 in. (5.08 cm) discharge fuel hose (Figure 2, Item 3).
6. Loosen hose clamp (Figure 2, Item 2) securing 2 in. (5.08 cm) discharge fuel hose (Figure 2, Item 3) to straight pipe adapter (Figure 2, Item 1).
7. Remove 2 in. (5.08 cm) discharge fuel hose (Figure 2, Item 3) from straight pipe adapter (Figure 2, Item 1) and drain contents into drip pan.
8. Remove hose clamp (Figure 2, Item 2) from 2 in. (5.08 cm) discharge fuel hose (Figure 2, Item 3).

REMOVAL – CONTINUED

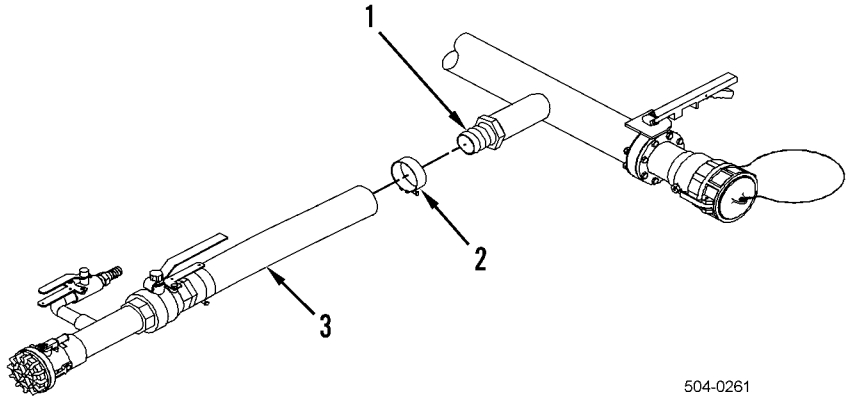


Figure 2. 2 in. (5.08 cm) Discharge Fuel Hose.

9. Remove four bolts (Figure 3, Item 2), four nuts (Figure 3, Item 6), and two clamps (Figure 3, Item 3) from frame (Figure 3, Item 5).
10. Remove discharge arm (Figure 3, Item 4), 1 in. (2.54 cm) fuel discharge hose (Figure 3, Item 7), and 2 in. (5.08 cm) fuel discharge hose (Figure 3, Item 1) from frame (Figure 3, Item 5) as an assembly.

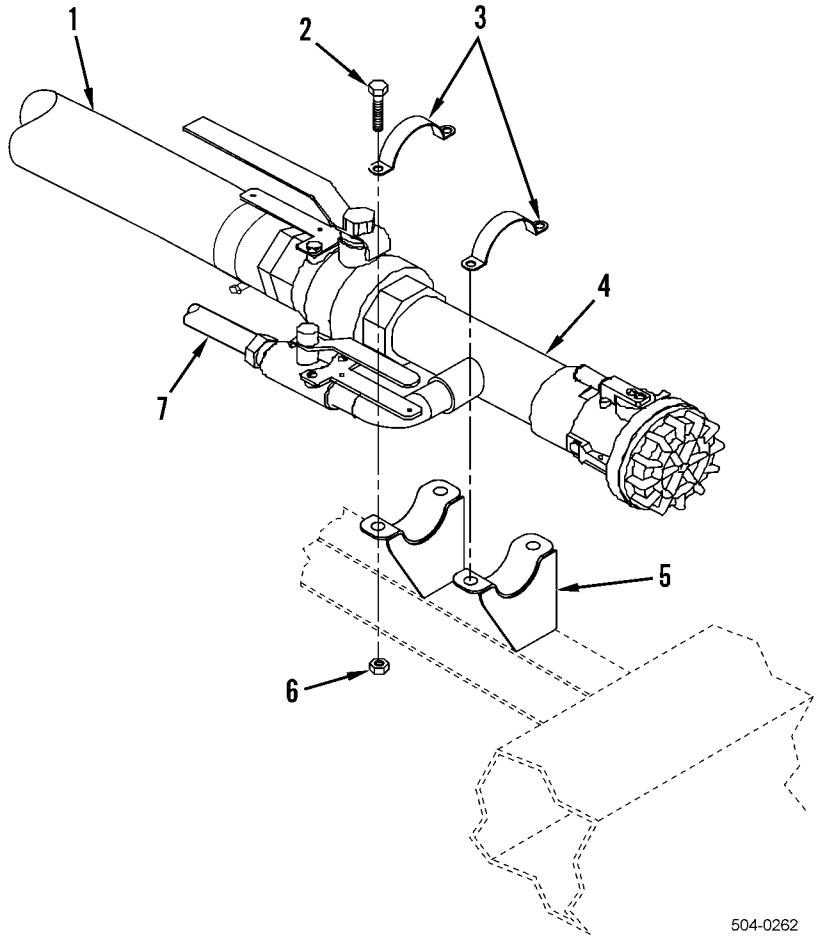


Figure 3. Discharge Arm Removal.

END OF TASK

DISASSEMBLY

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Loosen hose clamp (Figure 4, Item 7) securing 1 in. (2.54 cm) discharge fuel hose (Figure 4, Item 6) to hose barb (Figure 4, Item 8).
2. Remove 1 in. (2.54 cm) discharge fuel hose (Figure 4, Item 6) from hose barb (Figure 4, Item 8).
3. Remove hose clamp (Figure 4, Item 7) from 1 in. (2.54 cm) discharge fuel hose (Figure 4, Item 6).
4. Remove hose barb (Figure 4, Item 8) from ball valve (Figure 4, Item 9).
5. Remove ball valve (Figure 4, Item 9) from pipe nipple (Figure 4, Item 10).
6. Remove pipe nipple (Figure 4, Item 10) from pipe elbow (Figure 4, Item 11).
7. Remove pipe elbow (Figure 4, Item 11) from pipe nipple (Figure 4, Item 12).
8. Remove pipe nipple (Figure 4, Item 12) from discharge tube (Figure 4, Item 1).
9. Loosen hose clamp (Figure 4, Item 4) securing 2 in. (5.08 cm) discharge fuel hose (Figure 4, Item 5) to hose barb (Figure 4, Item 3).
10. Remove 2 in. (5.08 cm) discharge fuel hose (Figure 4, Item 5) and hose clamp (Figure 4, Item 4) from hose barb (Figure 4, Item 3).
11. Remove clamp (Figure 4, Item 4) from discharge fuel hose (Figure 4, Item 5).
12. Remove hose barb (Figure 4, Item 3) from ball valve (Figure 4, Item 2).
13. Remove ball valve (Figure 4, Item 2) from discharge tube (Figure 4, Item 1).
14. Remove discharge tube (Figure 4, Item 1) from quick disconnect coupling half (Figure 4, Item 13).

DISASSEMBLY – CONTINUED

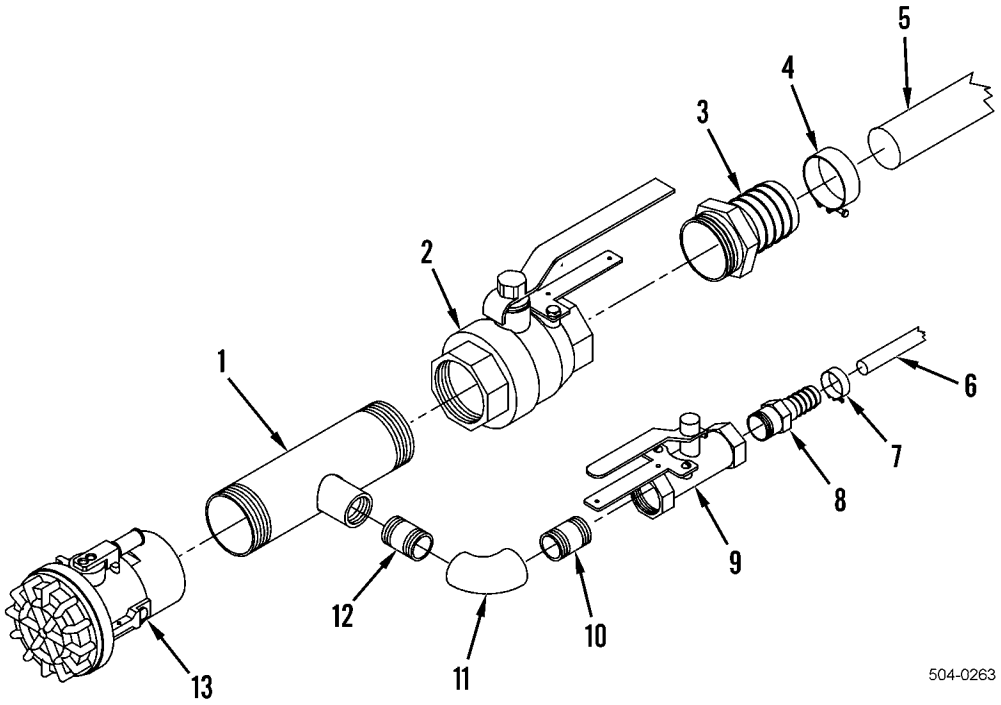


Figure 4. Discharge Arm Disassembly.

DISASSEMBLY – CONTINUED

15. Twist dust cap (Figure 5, Item 8) counterclockwise to remove it from coupling assembly (Figure 5, Item 4).
    a. Remove dust cap seal (Figure 5, Item 7) from dust cap (Figure 5, Item 8). Discard dust cap seal.
    b. Cut and remove cable (Figure 5, Item 1) from coupling assembly (Figure 5, Item 4).
    c. Remove split ring (Figure 5, Item 3), sleeve (Figure 5, Item 2) and cable (Figure 5, Item 1) from coupling assembly (Figure 5, Item 4).
16. Remove bumper (Figure 5, Item 6) from coupling assembly (Figure 5, Item 4) interface.
17. Remove coupling seal (Figure 5, Item 5) from coupling assembly (Figure 5, Item 4) interface.

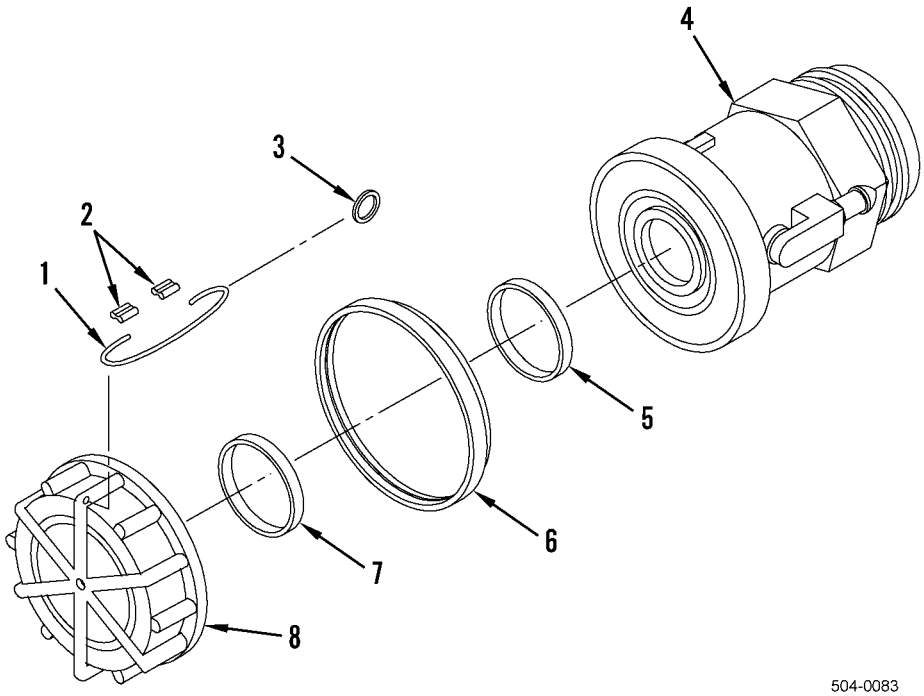


Figure 5. Valved Dry Break Coupling Assembly.

END OF TASK

CLEAN

WARNING

Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition. Failure to comply may cause injury or death to personnel.

1. Clean all metallic parts with a cleaning cloth and solvent cleaning compound.
2. Allow parts to dry thoroughly.

END OF TASK

ASSEMBLY

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Install coupling seal (Figure 5, Item 5) in groove of coupling (Figure 5, Item 4) interface.
2. Install bumper (Figure 5, Item 6) on coupling assembly (Figure 5, Item 4) interface with thin lip seal end facing away from coupling assembly (Figure 5, Item 4).
3. Install dust cap (Figure 5, Item 8) and dust cap seal (Figure 5, Item 7).
   a. Loop one end of 18 in. (45.72 cm) cable (Figure 5, Item 1) through sleeve (Figure 5, Item 2), dust cap (Figure 5, Item 8), and back through sleeve (Figure 5, Item 2).
   b. Crimp sleeve (Figure 5, Item 2).
   c. Loop other end of 18 in. (45.72 cm) cable (Figure 5, Item 1) through sleeve (Figure 5, Item 2), split ring (Figure 5, Item 1), and back through sleeve (Figure 5, Item 2).
   d. Crimp sleeve (Figure 5, Item 2).
   e. Install new seal (Figure 5, Item 7) on dust cap (Figure 5, Item 8).
4. Twist dust cap (Figure 5, Item 8) clockwise to until it locks on coupling assembly (Figure 5, Item 4).

ASSEMBLY – CONTINUED

WARNING

Goggles and gloves must be worn when working with sealing compound. Avoid contact with eyes and skin. Avoid breathing vapors and ensure there is adequate ventilation. If sealing compound contacts eyes, flush eyes with cold water for at least 15 minutes and seek immediate medical attention. If sealing compound contacts skin, wash skin thoroughly with soap and water. Failure to comply could result in injury to personnel.

NOTE

Apply sealing compound to all threaded mating surfaces.

5. Apply sealing compound to threads of discharge tube (Figure 6, Item 1) and install quick disconnect coupling half (Figure 6, Item 13) on discharge tube.
6. Apply sealing compound to threads of discharge tube (Figure 6, Item 1) and install ball valve (Figure 6, Item 2) on discharge tube.
7. Apply sealing compound to threads on hose barb (Figure 6, Item 3) and install hose barb into ball valve (Figure 6, Item 2).
8. Install hose clamp (Figure 6, Item 4) on 2 in. (5.08 cm) discharge fuel hose (Figure 6, Item 5), install hose and clamp on hose barb (Figure 6, Item 3), and tighten clamp.
9. Apply sealing compound to threads on pipe nipple (Figure 6, Item 12) and install pipe nipple into discharge tube (Figure 6, Item 1).
10. Apply sealing compound to threads on pipe nipple (Figure 6, Item 12) and install elbow (Figure 6, Item 11) onto pipe nipple.
11. Apply sealing compound to threads on pipe nipple (Figure 6, Item 10) and install pipe nipple into pipe elbow (Figure 6, Item 11).
12. Apply sealing compound to threads on pipe nipple (Figure 6, Item 10) and install ball valve (Figure 6, Item 9) on pipe nipple.
13. Apply sealing compound to threads on hose barb (Figure 6, Item 8) and install hose barb into ball valve (Figure 6, Item 9).
14. Install hose clamp (Figure 6, Item 7) on 1 in. (2.54 cm) discharge fuel hose (Figure 6, Item 6), install hose and clamp on hose barb (Figure 6, Item 8), and tighten clamp.

ASSEMBLY – CONTINUED

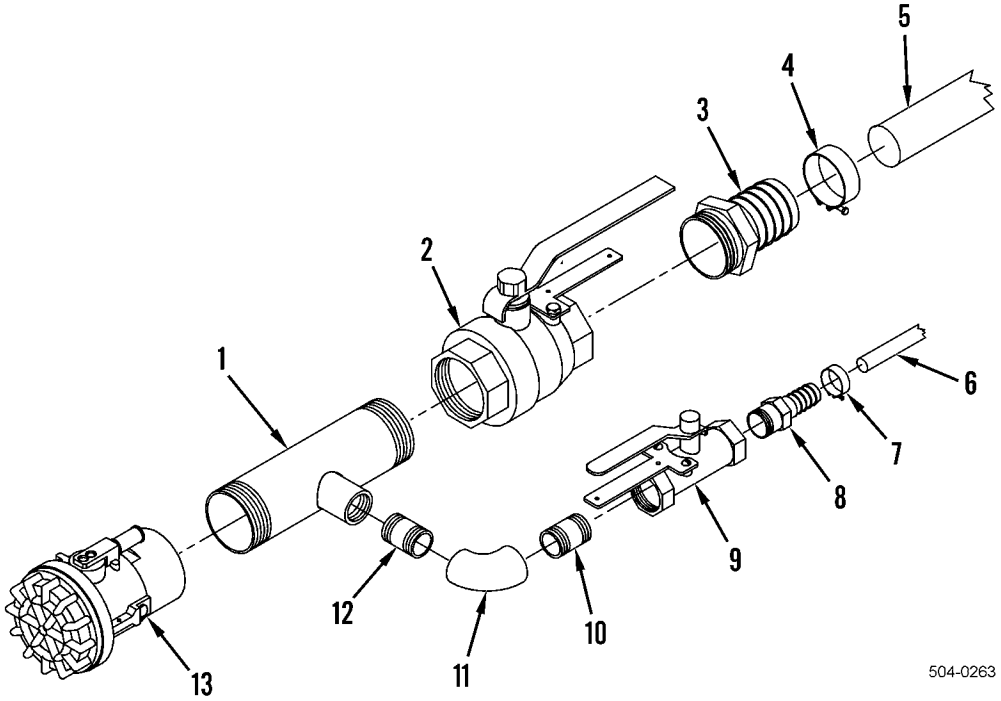


Figure 6. Discharge Arm Assembly.

END OF TASK

INSTALLATION

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Position discharge arm (Figure 7, Item 4), 1 in. (2.54 cm) fuel discharge hose (Figure 7, Item 7), and 2 in. (5.08 cm) fuel discharge hose (Figure 7, Item 1) on frame (Figure 7, Item 5) as an assembly.
2. Secure fuel discharge arm (Figure 7, Item 4) on frame (Figure 7, Item 5) with two clamps (Figure 7, Item 3), four bolts (Figure 7, Item 2) and four nuts (Figure 7, Item 6). Tighten bolts and nuts securely.

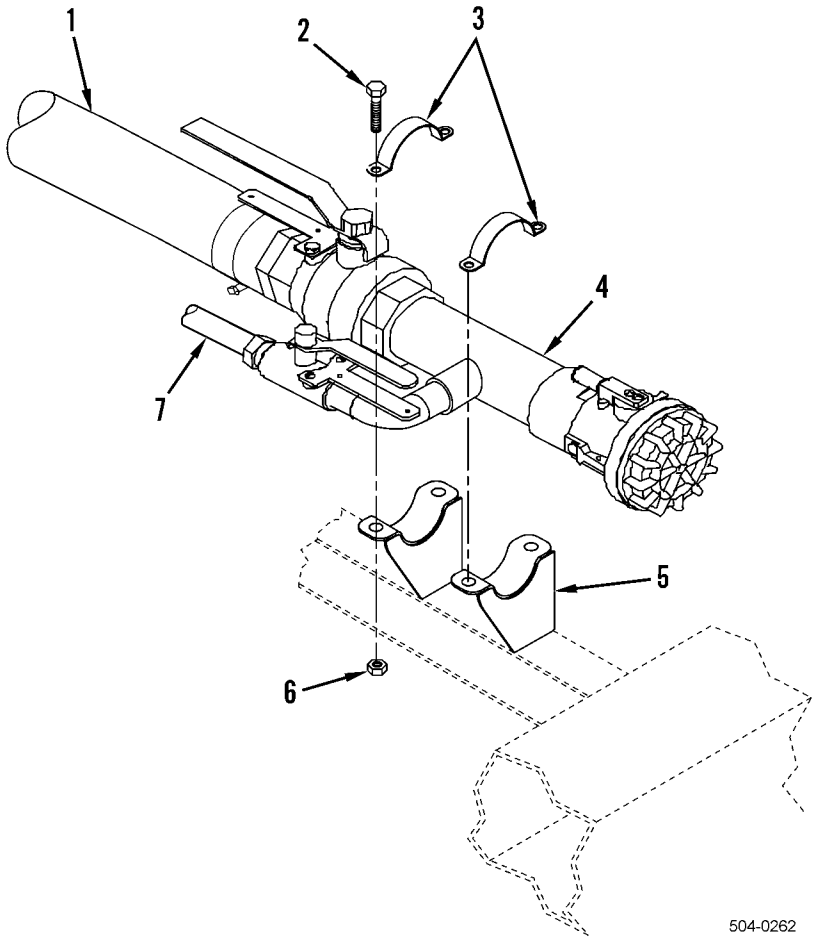


Figure 7. Discharge Arm Installation.

INSTALLATION – CONTINUED

3. Install hose clamp (Figure 8, Item 2) on 2 in. (5.08 cm) discharge fuel hose (Figure 8, Item 3).
4. Install 2 in. (5.08 cm) discharge fuel hose (Figure 8, Item 3) on straight pipe adapter (Figure 8, Item 1) and tighten hose clamp (Figure 8, Item 2).

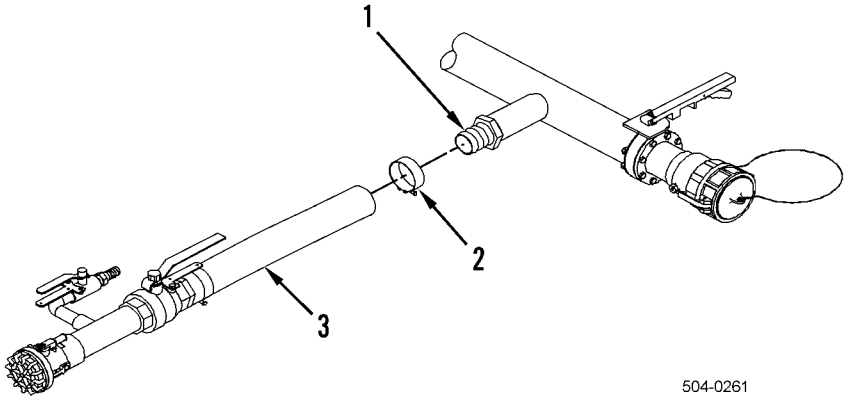


Figure 8. 2 in. (5.08 cm) Discharge Fuel Hose.

5. Install hose clamp (Figure 9, Item 2) on 1 in. (2.54 cm) discharge fuel hose (Figure 9, Item 3).
6. Install 1 in. (2.54 cm) discharge fuel hose (Figure 9, Item 3) on hose barb (Figure 9, Item 1) and tighten hose clamp (Figure 9, Item 2).

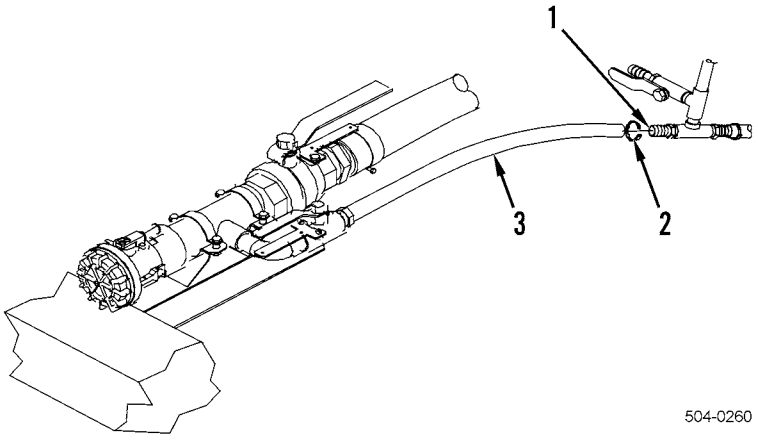


Figure 9. 1 in. (2.54 cm) Discharge Fuel Hose

7. Add fuel and check all connection points for leaks.
8. Remove drip pan and dispose of contents per local procedures.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

NON-VALVED DRY BREAK COUPLING ASSEMBLY REPLACEMENT
Removal, Clean, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)

Materials/Parts

Cleaning compound, solvent (WP 0153, Item 2)
Cloth, cleaning (WP 0153, Item 5)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Sealing compound (WP 0153, Item 17)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0131

Equipment Condition

TRM shut down (WP 0022)

REMOVAL

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

NOTE

There are valved and non-valved dry break coupling assemblies that are replaced in the same way. This procedure covers a non-valved dry break coupling.

REMOVAL – CONTINUED

1. Open manhole cover to relieve pressure.
2. Using pipe wrench, remove non-valved dry break coupling (Figure 1, Item 1) from nipple-half (Figure 1, Item 2).

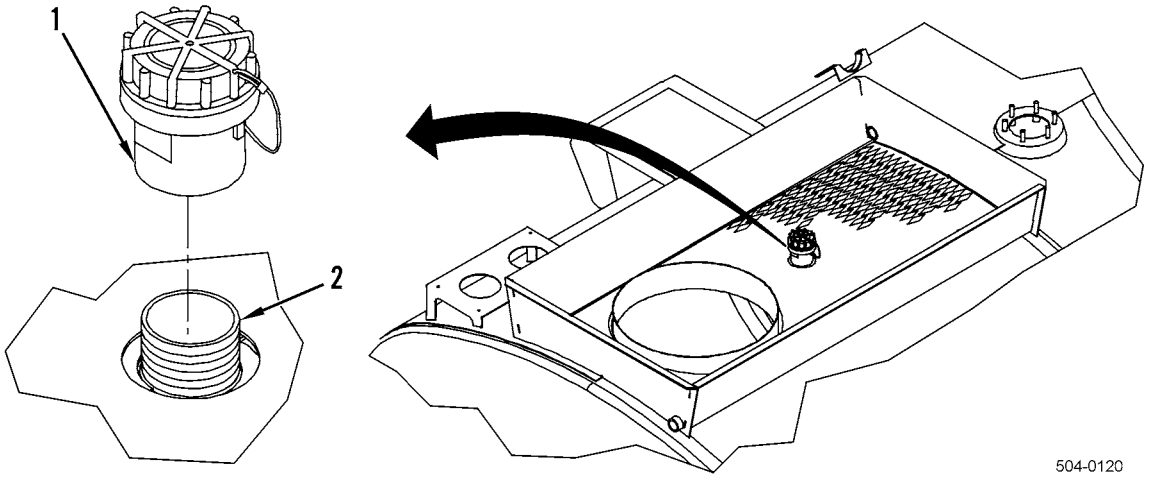
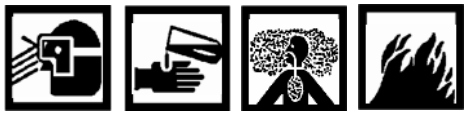


Figure 1. Non-Valved Dry Break Coupling Assembly.

END OF TASK

CLEAN

WARNING



Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition. Failure to comply may cause injury or death to personnel.

1. Clean threads on non-valved dry break coupling with a cleaning cloth and solvent cleaning compound. Allow parts to thoroughly dry.
2. Clean threads on nipple-half with a cleaning cloth and solvent cleaning compound. Allow parts to thoroughly dry.
3. Inspect threads on non-valved dry break coupling for cracks, corrosion, or damage. If cracks, corrosion, or damage are found, replace with a serviceable like item.

END OF TASK

INSTALLATION

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Goggles and gloves must be worn when working with sealing compound. Avoid contact with eyes and skin. Avoid breathing vapors and ensure there is adequate ventilation. If sealing compound contacts eyes, flush eyes with cold water for at least 15 minutes and seek immediate medical attention. If sealing compound contacts skin, wash skin thoroughly with soap and water.
- Failure to comply could result in injury or death to personnel.

1. Apply sealing compound to threads of nipple-half (Figure 1, Item 2).
2. Install non-valved dry break coupling (Figure 1, Item 1) on nipple-half (Figure 1, Item 2).
3. Close manhole cover.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

NON-VALVED DRY BREAK COUPLING ASSEMBLY REPAIR
Disassembly, Clean, Assembly

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)
Single diameter hand tool (WP 0151, Item 3)

Materials/Parts

Cleaning compound, solvent (WP 0153, Item 2)
Cloth, cleaning (WP 0153, Item 5)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Rope, wire (WP 0154, Item 29)
Seal, plain (WP 0154, Item 30) (2)

Materials/Parts - Continued

Sleeve, swagging, wire rope (WP 0154, Item 32) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0012
WP 0131

Equipment Condition

TRM shut down (WP 0022)

DISASSEMBLY

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

NOTE

Ensure discharge arm has been evacuated (WP 0012).

1. Place drip pan under discharge arm.
2. Twist dust cap (Figure 1, Item 8) counterclockwise to remove it from coupling assembly (Figure 1, Item 4).
3. Remove dust cap (Figure 1, Item 8) and dust cap seal (Figure 1, Item 7).
   a. Cut and remove cable (Figure 1, Item 1) from coupling assembly (Figure 1, Item 4).
   b. Remove ring (Figure 1, Item 3) and cable (Figure 1, Item 1) from coupling assembly (Figure 1, Item 4).
   c. Remove dust cap seal (Figure 1, Item 7) from dust cap (Figure 1, Item 8).
4. Remove bumper (Figure 1, Item 6) from coupling assembly (Figure 1, Item 4) interface.
5. Remove coupling seal (Figure 1, Item 5) from coupling assembly (Figure 1, Item 4) interface.

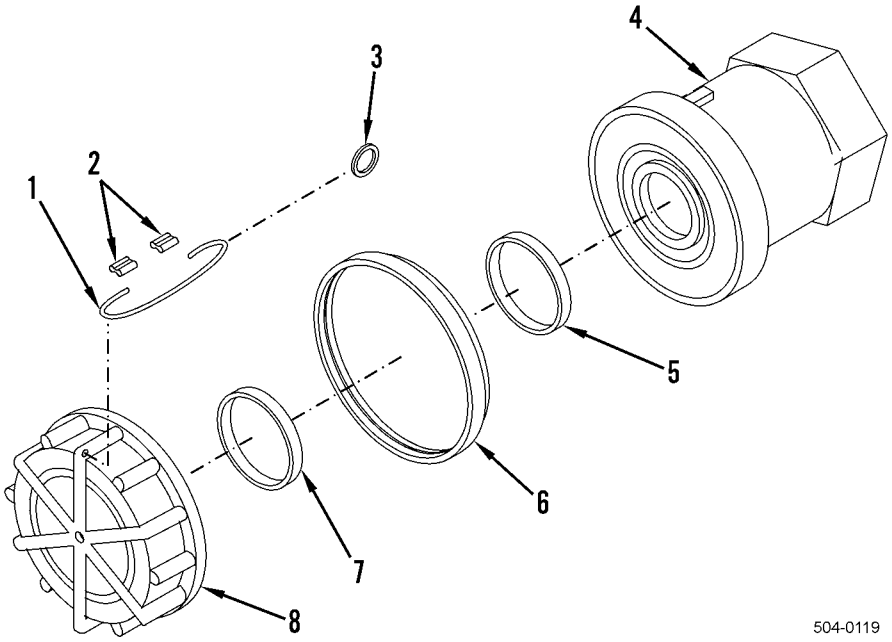


Figure 1. Non-Valved Dry Break Coupling Assembly.

END OF TASK

CLEAN

WARNING

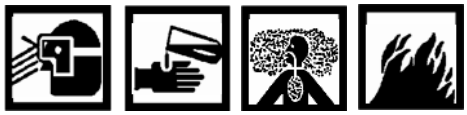
Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition. Failure to comply may cause injury or death to personnel.

1. Clean all metallic parts with a cleaning cloth and solvent cleaning compound.
2. Allow parts to thoroughly dry.

END OF TASK

ASSEMBLY

WARNING



Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Install new coupling seal (Figure 1, Item 5) in groove of coupling (Figure 1, Item 4) interface.
2. Install new bumper (Figure 1, Item 6) on coupling assembly Figure 1, Item 2) interface with thin lip seal end facing away from coupling assembly (Figure 1, Item 4).
3. Install dust cap (Figure 1, Item 8) and dust cap seal (Figure 1, Item 7).
   a. Loop one end of new 18 in. (45.72 cm) cable (Figure 1, Item 1) through new sleeve (Figure 1, Item 2), dust cap (Figure 1, Item 8), and back through sleeve (Figure 1, Item 2).
   b. Crimp sleeve (Figure 1, Item 2).
   c. Loop other end of 18 in. (45.72 cm) cable (Figure 1, Item 1) through sleeve (Figure 1, Item 2), split ring (Figure 1, Item 3), and back through sleeve (Figure 1, Item 2).
   d. Crimp sleeve (Figure 1, Item 2).
   e. Install new seal (Figure 1, Item 7) on dust cap (Figure 1, Item 8).
4. Twist dust cap (Figure 1, Item 8) clockwise until it locks on coupling assembly (Figure 1, Item 4).
5. Remove drip pan and dispose of contents per local procedures.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

FUEL PUMP STRAINER SERVICE
Removal, Inspection, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Cloth, cleaning (WP 0153, Item 5)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)
O-ring (WP 0154, Item 21)

Personnel Required

Petroleum Supply Specialist 91J

References

WP 0132

Equipment Condition

TRM shut down (WP 0022)
Battery box lid removed (WP 0033)
Battery negative cable removed (WP 0056-2, steps 1 - 3)

REMOVAL

WARNING

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NOTE

- Place drip pan under fuel filter cover before removing bolts from cover.
- Loosen fuel strainer cover bolts equally to release spring tension.

1. Remove two bolts (Figure 1, Item 6) and fuel strainer cover (Figure 1, Item 5) from fuel pump (Figure 1, Item 1).
2. Remove spring (Figure 1, Item 3), O-ring (Figure 1, Item 4) and fuel strainer (Figure 1, Item 2) from fuel pump (Figure 1, Item 1). Discard O-ring.

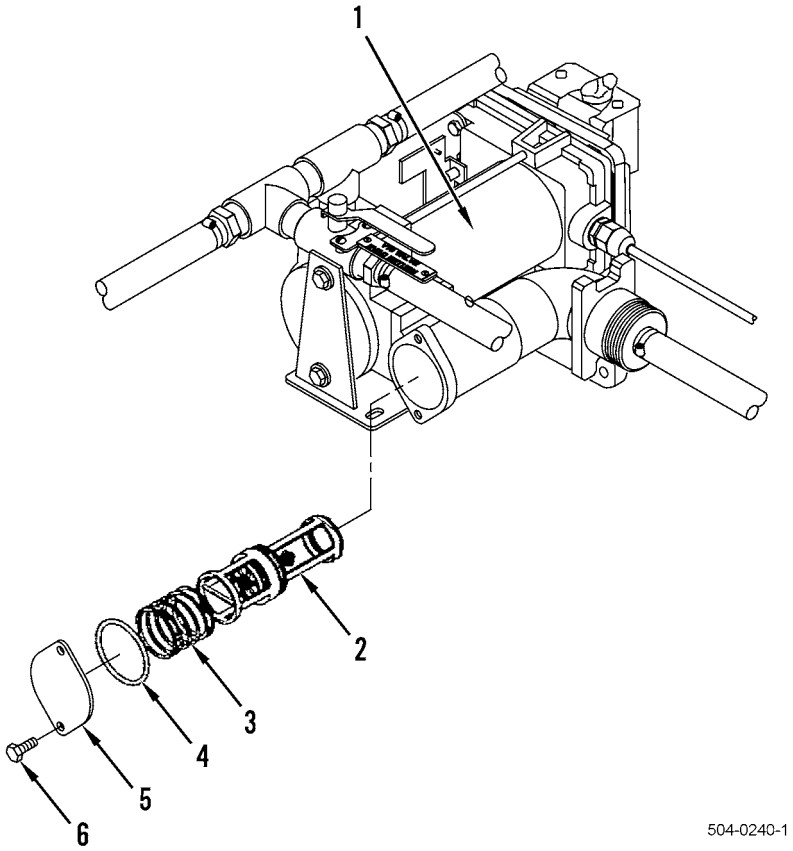

Figure 1. Fuel Pump Strainer.

END OF TASK

INSPECTION

1. Ensure strainer is not damaged or torn.
2. Ensure strainer is free of dirt or debris. Clean strainer as required.

END OF TASK

INSTALLATION

1. Install fuel strainer (Figure 1, Item 2), new O-ring (Figure 1, Item 4) and spring (Figure 1, Item 3) on fuel pump (Figure 1, Item 1).

NOTE

Bolts must be tightened equally to properly tension spring and prevent leaks.

2. Install fuel strainer cover (Figure 1, Item 5) and two bolts (Figure 1, Item 6) on fuel pump (Figure 1, Item 1).
3. Connect battery negative cable (WP 0056-6, steps 15 - 20).
4. Install battery box lid (WP 0033).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

FUEL PUMP ASSEMBLY REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)
Sealing compound (WP 0153, Item 17)
Nut, self-locking, hex (WP 0154, Item 18) (4)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

FM 10-67-1
WP 0132

Equipment Condition

TRM shut down (WP 0022)
TRM drained (WP 0017)
Battery box lid removed (WP 0033)
Battery negative cable removed (WP 0056-2, steps 1 - 3)
Fuel pump assembly wiring harness removed from fuel pump assembly (WP 0079-2, step 2)

REMOVAL

WARNING

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REMOVAL – CONTINUED

1. Place drip pan under fuel pump inlet hose (Figure 1, Item 5).
2. Loosen hose clamp (Figure 1, Item 4) and remove inlet hose (Figure 1, Item 5) from fuel pump (Figure 1, Item 3).
3. Place drip pan under V9 discharge hose (Figure 1, Item 2).
4. Loosen hose clamp (Figure 1, Item 1) and remove V9 discharge hose (Figure 1, Item 2) from double tee-pipe (Figure 1, Item 14).
5. Place drip pan under V8 discharge hose (Figure 1, Item 12).
6. Loosen hose clamp (Figure 1, Item 13) and remove V8 discharge hose (Figure 1, Item 12) from double tee-pipe (Figure 1, Item 14).
7. Place drip pan under fuel pump V10 evacuation hose (Figure 1, Item 7).
8. Loosen hose clamp (Figure 1, Item 6) and remove V10 evacuation return hose (Figure 1, Item 7) from valve (Figure 1, Item 11).
9. Remove nut (Figure 1, Item 9), lockwasher (Figure 1, Item 10), and handle (Figure 1, Item 8) from valve (Figure 1, Item 11).
10. Remove valve (Figure 1, Item 11) from double tee-pipe (Figure 1, Item 14).

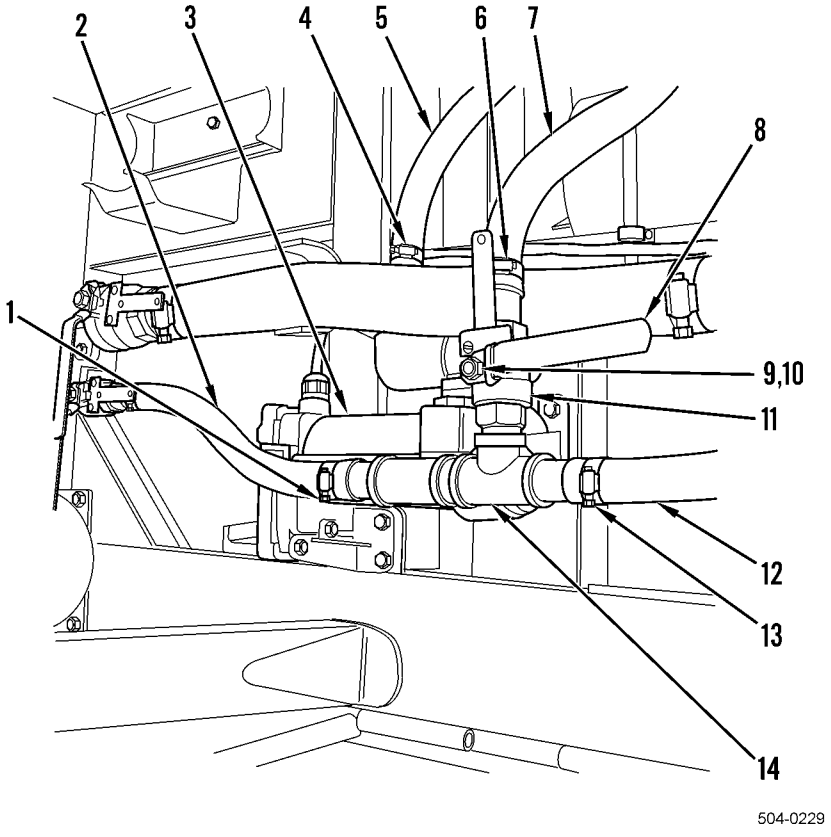

Figure 1. Fuel Pump Hoses.

REMOVAL – CONTINUED

11. Remove two bolts (Figure 2, Item 1) from mounting bracket (Figure 2, Item 11).
12. Remove two bolts (Figure 2, Item 4), washers (Figure 2, Item 3), and fuel pump (Figure 2, Item 2) from mounting bracket (Figure 2, Item 5).
13. If necessary, remove two bolts (Figure 2, Item 6), locknuts (Figure 2, Item 8), washers (Figure 2, Item 7) and mounting bracket (Figure 2, Item 5) from TRM frame. Discard locknuts.
14. If necessary, remove two bolts (Figure 2, Item 10), locknuts (Figure 2, Item 9), washers (Figure 2, Item 12), and mounting bracket (Figure 2, Item 11) from TRM frame. Discard locknuts.

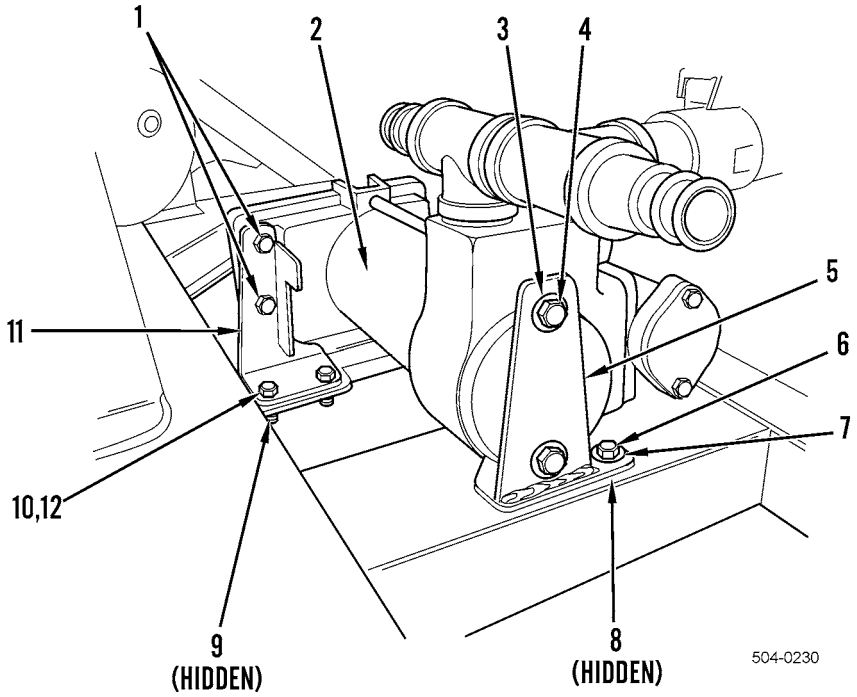

Figure 2. Fuel Pump Assembly.

END OF TASK

INSTALLATION

WARNING

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1. If necessary, install mounting bracket (Figure 2, Item 11), two bolts (Figure 2, Item 10), washers (Figure 2, Item 12), and new locknuts (Figure 2, Item 9) on TRM frame.
2. If necessary, install mounting bracket (Figure 2, Item 5), two washers (Figure 2, Item 7), bolts (Figure 2, Item 6), and new locknuts (Figure 2, Item 8) on TRM frame.

INSTALLATION – CONTINUED

3. Install fuel pump (Figure 2, Item 2), two washers (Figure 2, Item 3), and bolts (Figure 2, Item 4) on mounting bracket (Figure 2, Item 5).
4. Install two bolts (Figure 2, Item 1) on mounting bracket (Figure 2, Item 11).
5. Apply sealing compound to threads of double tee-pipe (Figure 3, Item 14) and install valve (Figure 3, Item 11) on double tee-pipe (Figure 3, Item 14).
6. Install handle (Figure 3, Item 8), lockwasher (Figure 3, Item 10), and nut (Figure 3, Item 9) on valve (Figure 3, Item 11).
7. Install V10 evacuation return hose (Figure 3, Item 7) on valve (Figure 3, Item 11) and tighten hose clamp (Figure 3, Item 6).
8. Install V8 discharge hose (Figure 3, Item 12) on double tee-pipe (Figure 3, Item 14) and tighten hose clamp (Figure 3, Item 13).
9. Install V9 discharge hose (Figure 3, Item 2) on double tee-pipe (Figure 3, Item 14) and tighten hose clamp (Figure 3, Item 1).
10. Install inlet hose (Figure 3, Item 5) on fuel pump (Figure 3, Item 3) and tighten hose clamp (Figure 3, Item 4).

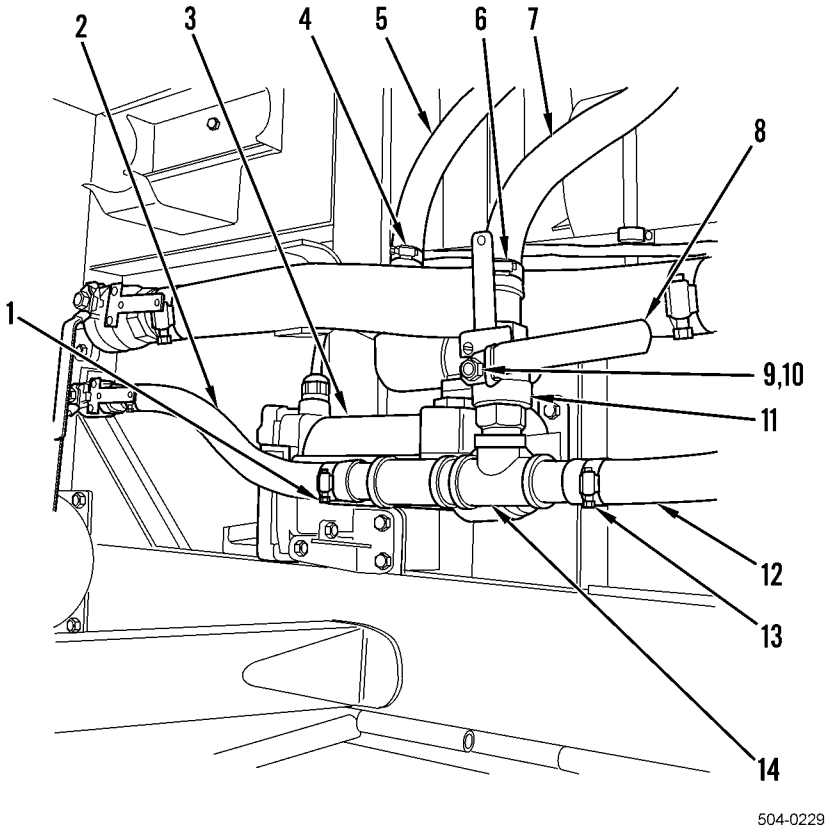


Figure 3. Fuel Pump Hoses.

INSTALLATION – CONTINUED

11. Remove drip pan and discard contents per local procedures.
12. Install fuel pump assembly wiring harness to fuel pump assembly (WP 0079-5, steps 1 - 2).
13. Connect battery negative cable (WP 0056-6, steps 16, 18 - 20).
14. Install battery box lid (WP 0033).
15. Add fuel and check for leaks.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

FUEL PUMP ASSEMBLY SWITCH REPLACEMENT
Removal, Test, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

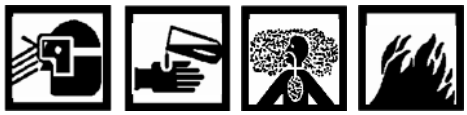
WP 0132

Equipment Condition

TRM shut down (WP 0022)
Battery box lid removed (WP 0033)
Battery negative cable removed (WP 0056-2, steps 1 - 3)

REMOVAL

WARNING



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1. Remove six screws (Figure 1, Item 2) and fuel pump assembly conduit box cover (Figure 1, Item 1) from fuel pump assembly conduit box (Figure 1, Item 3).

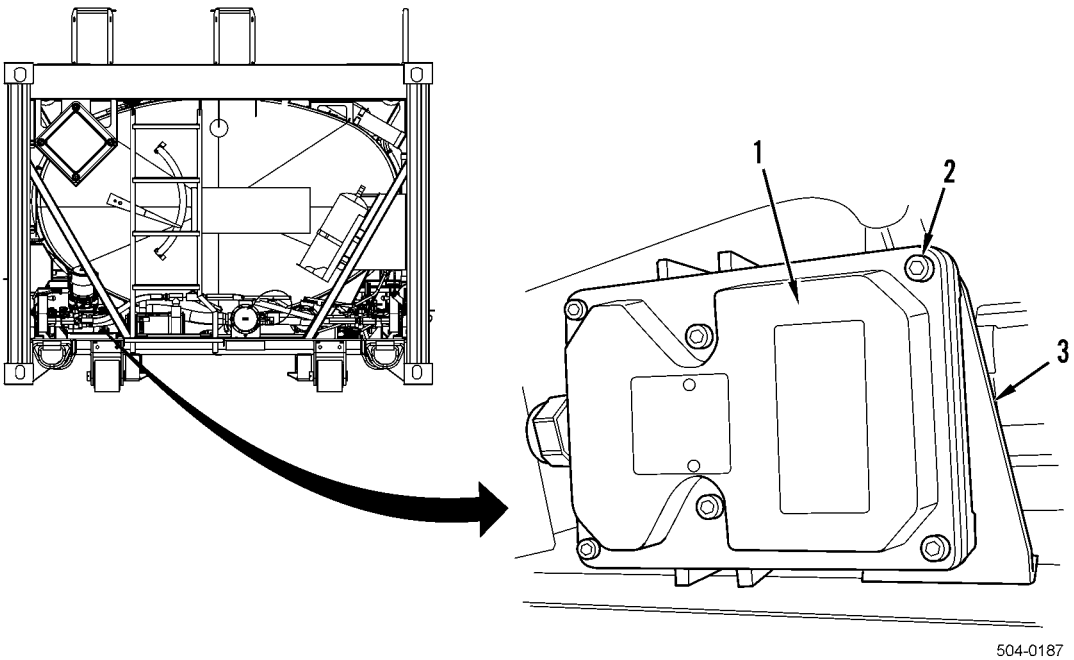

Figure 1. Fuel Pump Assembly Switch Cover.

REMOVAL – CONTINUED

2. Remove two screws (Figure 2, Item 3) and switch mounting bracket (Figure 2, Item 4) from fuel pump assembly conduit box (Figure 2, Item 1).

NOTE

Tag wires to aid installation.

3. Remove screw (Figure 2, Item 2) and three wires (Figure 2, Items 9 and 10) from fuel pump switch (Figure 2, Item 6).
4. Remove screw (Figure 2, Item 7) and wire (Figure 2, Item 8) from fuel pump switch (Figure 2, Item 6).
5. Remove two screws (Figure 2, Item 5) and fuel pump switch (Figure 2, Item 6) from switch mounting bracket (Figure 2, Item 4).

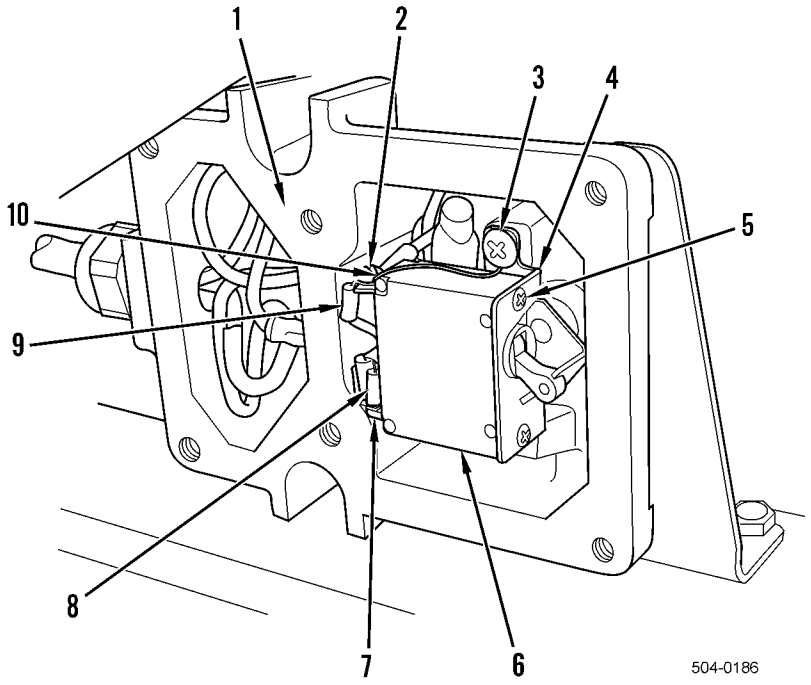

Figure 2. Fuel Pump Assembly Switch.

END OF TASK

TEST

1. Turn fuel pump switch on, put multimeter leads on two switch terminals, and check for continuity.
2. If there is no continuity, replace fuel pump switch.

END OF TASK

INSTALLATION

WARNING

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1. Install fuel pump switch (Figure 2, Item 6) and two screws (Figure 2, Item 5) on switch mounting bracket (Figure 2, Item 4).

NOTE

Install wires as tagged and marked during removal.

2. Install wire (Figure 2, Item 8) and screw (Figure 2, Item 7) on fuel pump switch (Figure 2, Item 6).
3. Install three wires (Figure 2, Items 9 and 10) and screw (Figure 2, Item 2) on fuel pump switch (Figure 2, Item 6).
4. Install switch mounting bracket (Figure 2, Item 4) and two screws (Figure 2, Item 3) on fuel pump assembly conduit box (Figure 2, Item 1).
5. Install fuel pump assembly conduit box cover (Figure 3, Item 1) and six screws (Figure 3, Item 2) on fuel pump assembly conduit box (Figure 3, Item 3).

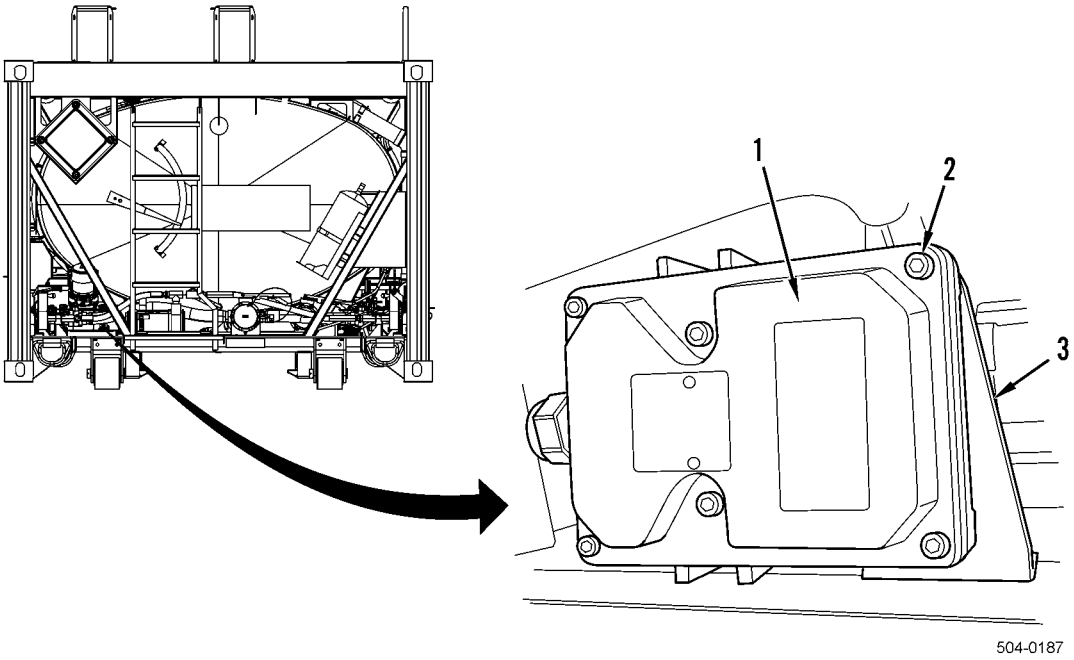


Figure 3. Fuel Pump Assembly Switch Cover.

INSTALLATION – CONTINUED

6. Connect battery negative cable (WP 0056-6, steps 15 - 20).
7. Install battery box lid (WP 0033).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

FUEL PUMP ASSEMBLY WIRING HARNESS REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Strap, tiedown (WP 0153, Item 18)
Nut, self-locking, hex (WP 0154, Item 16) (7)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0132

Equipment Condition

TRM shut down (WP 0022)
Battery box lid removed (WP 0033)
Battery negative cable removed (WP 0056-2, steps 1 - 3)

REMOVAL

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. To disconnect fuel pump assembly wiring harness from battery, proceed as follows:
   a. Confirm presence of nut (Figure 1, Item 1) and removal of fuel pump negative (black) wire (Figure 1, Item 3) from battery negative cable (Figure 1, Item 2).
   b. Remove nut (Figure 1, Item 5) and wiring harness ground wire (Figure 1, Item 4) from battery hold down bracket (Figure 1, Item 6). Replace nut.
   c. Remove fuel pump assembly positive wire (red) (Figure 1, Item 8) from wiring harness circuit breaker (Figure 1, Item 7).

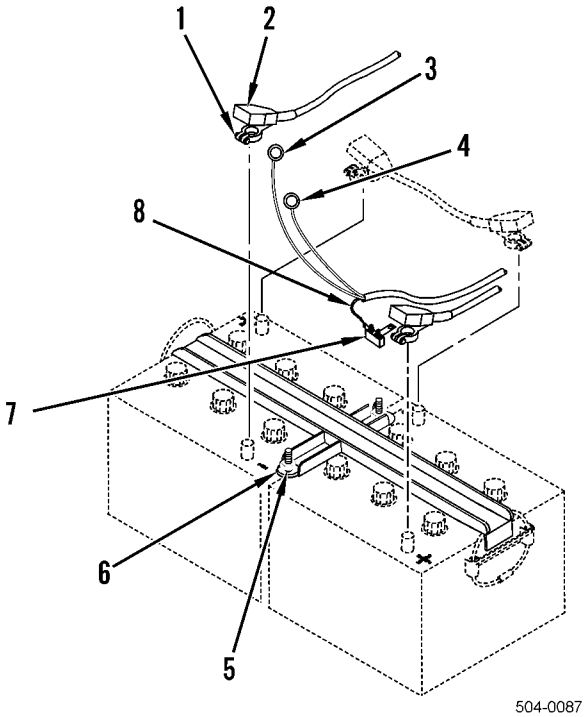


Figure 1. Batteries.

2. To disconnect fuel pump assembly wiring harness from fuel pump assembly, proceed as follows:
   a. Remove six screws (Figure 2, Item 2) and fuel pump assembly conduit box cover (Figure 2, Item 1) from fuel pump assembly conduit box (Figure 2, Item 3).

REMOVAL – CONTINUED

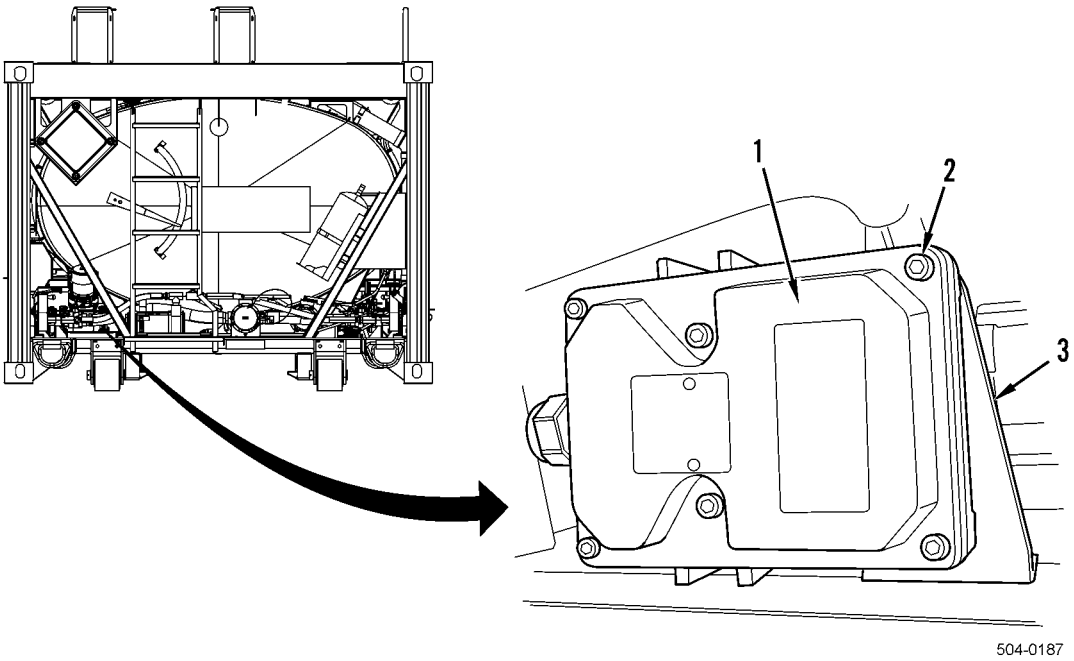


Figure 2. Fuel Pump Assembly.

b. Remove screw (Figure 3, Item 4) and disconnect wire harness negative wire (black) (Figure 3, Item 3) from fuel pump assembly conduit box (Figure 3, Item 5).

c. Disconnect wire harness positive wire (white) (Figure 3, Item 2) at butt connector.

d. Disconnect wire harness conduit fitting (Figure 3, Item 1) from fuel pump assembly conduit box (Figure 3, Item 5).

e. Pull wiring from fuel pump assembly conduit box (Figure 3, Item 5) through elbow fitting.

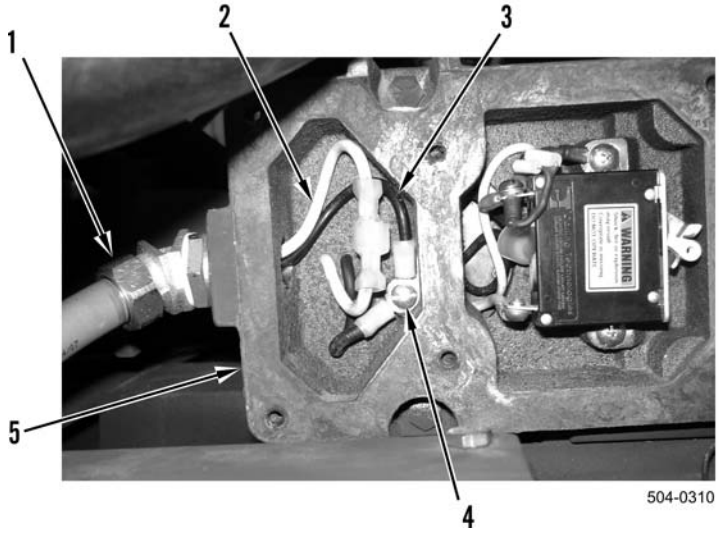


Figure 3. Fuel Pump Assembly Conduit Box.

REMOVAL – CONTINUED

3. Remove three harness clamps (Figure 4, Item 1), locknuts (Figure 4, Item 3) from studs (Figure 4, Item 2), and cable tiedown straps where present. Note position and number of tiedown straps. Discard locknuts.

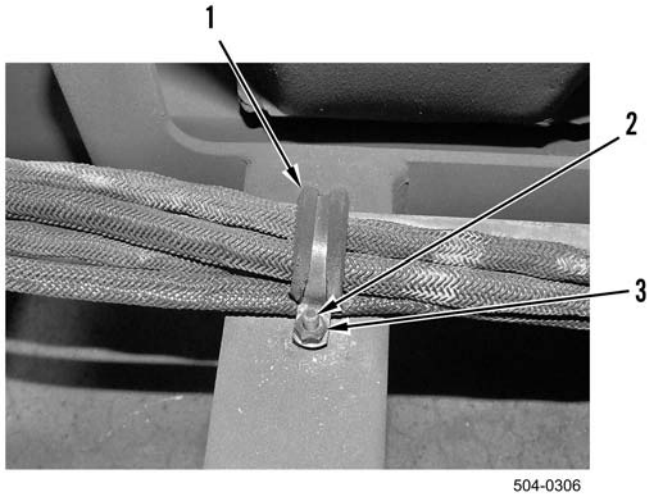


Figure 4. Harness Clamp.

4. Remove wiring harness EMI box (Figure 5, Item 1) by removing four bolts (Figure 5, Item 3) and locknuts (Figure 5, Item 2). Discard locknuts.
5. Remove fuel pump assembly wiring harness (Figure 5, Item 4) with EMI box (Figure 5, Item 1).

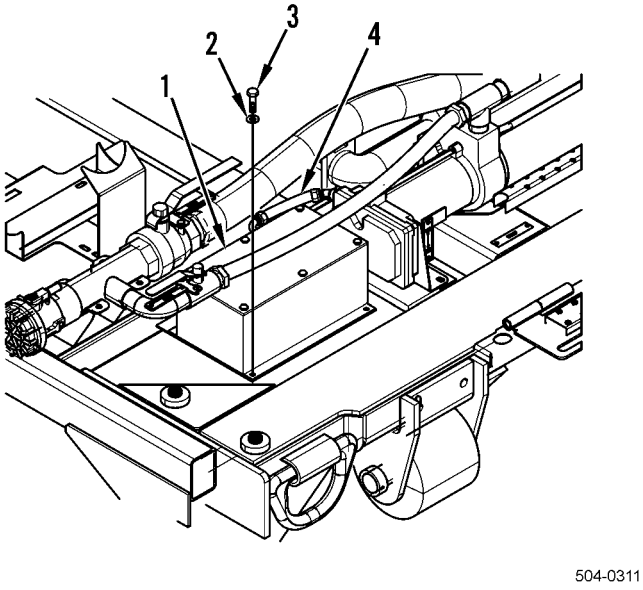


Figure 5. Wiring Harness and EMI Box.

END OF TASK

INSTALLATION

1. Position fuel pump assembly wiring harness and EMI box on TRM.
2. To install fuel pump assembly wiring harness to fuel pump assembly, proceed as follows:
   a. Feed wiring harness positive (white) (Figure 6, Item 2) and negative (black) (Figure 6, Item 3) wires through elbow fitting into fuel pump assembly conduit box (Figure 6, Item 5).
   b. Install screw (Figure 6, Item 4) and connect wiring harness negative wire (black) (Figure 6, Item 3) to fuel pump assembly conduit box (Figure 6, Item 5).
   c. Connect wiring harness positive wire (white) (Figure 6, Item 2) to butt connector.
   d. Connect wiring harness conduit fitting (Figure 6, Item 1) to fuel pump assembly conduit box (Figure 6, Item 5).

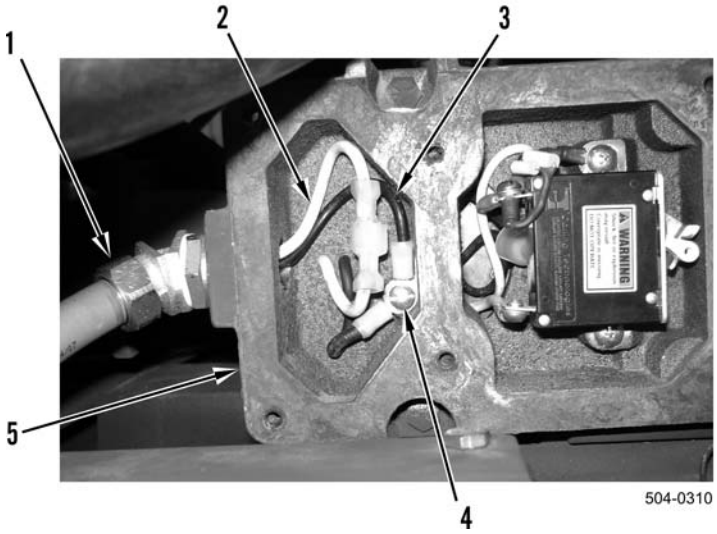


Figure 6. Fuel Pump Assembly Conduit Box.

INSTALLATION – CONTINUED

e. Install six screws (Figure 7, Item 2) and fuel pump assembly conduit box cover (Figure 7, Item 1) on fuel pump assembly conduit box (Figure 7, Item 3).

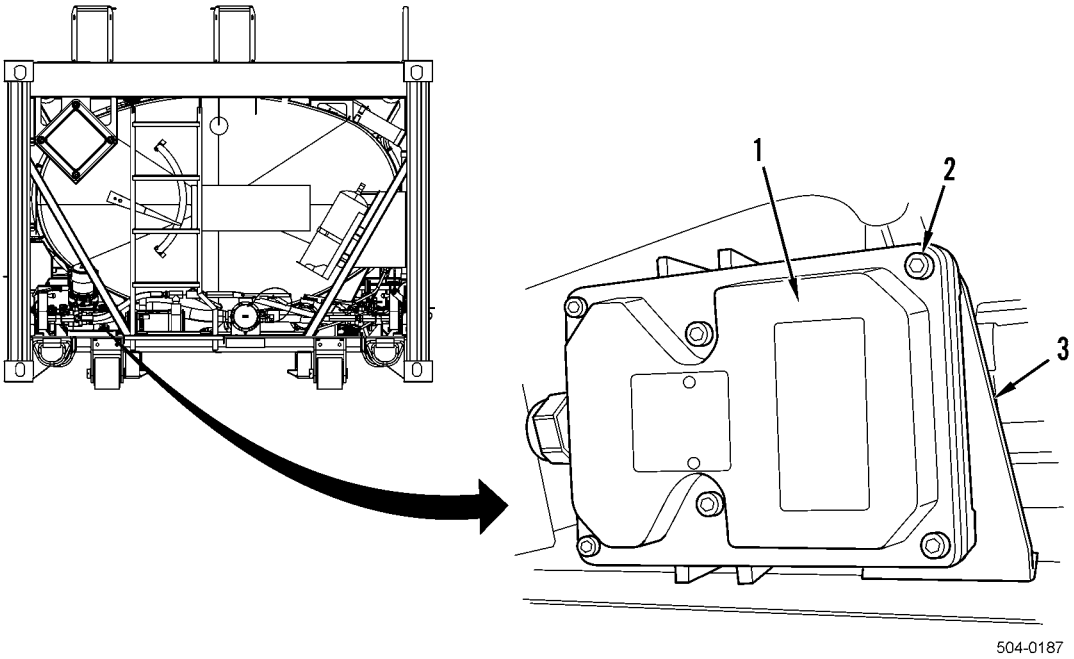


Figure 7. Fuel Pump Assembly Switch Cover.

3. Install wiring harness EMI box (Figure 8, Item 1) with four bolts (Figure 8, Item 3) and new locknuts (Figure 8, Item 2).

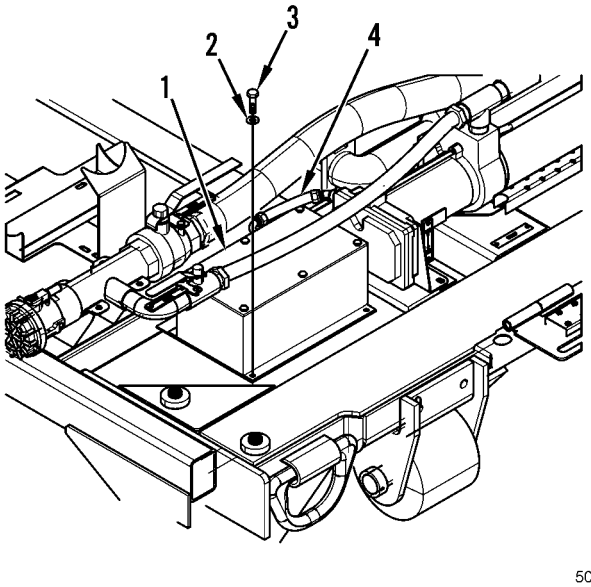


Figure 8. Wiring Harness and EMI Box.

4. Install three harness clamps (Figure 9, Item 1) and new locknuts (Figure 9, Item 3) on studs (Figure 9, Item 2). Install tiedown straps where previously located.

INSTALLATION – CONTINUED

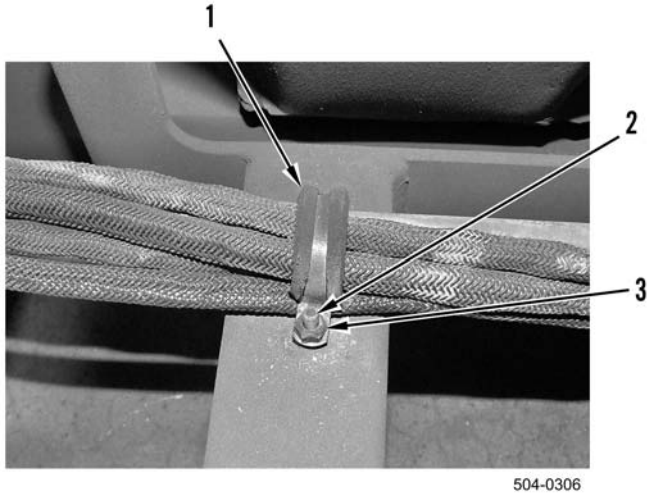


Figure 9. Harness Clamp.

5. To connect fuel pump assembly wiring harness to battery, proceed as follows:
   a. Install fuel pump assembly positive wire (red) (Figure 10, Item 8) to wiring harness circuit breaker (Figure 10, Item 7).
   b. Remove and install nut (Figure 10, Item 5) and fuel pump wiring harness ground wire (Figure 10, Item 4) to battery hold down bracket (Figure 10, Item 6).
   c. Install nut (Figure 10, Item 1) and fuel pump negative wire (black) (Figure 10, Item 3) to battery negative cable (Figure 10, Item 2).

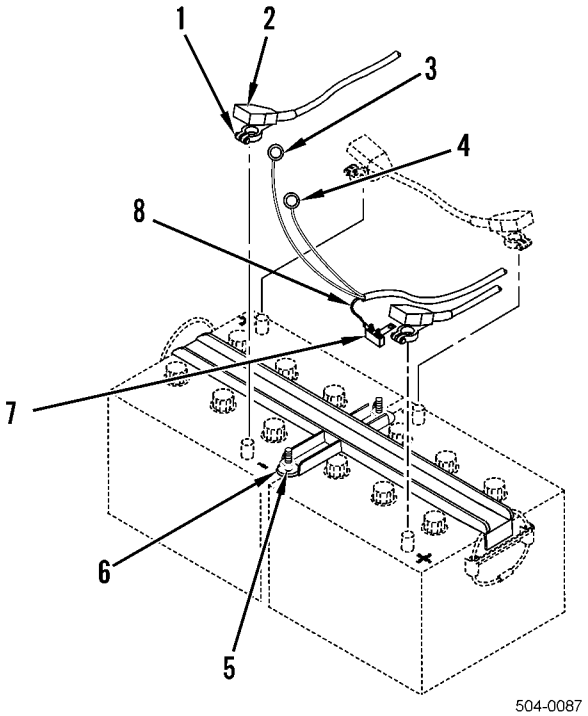


Figure 10. Batteries.

INSTALLATION – CONTINUED

6. Connect battery negative cable (WP 0056-6, steps 16, 18 - 20).
7. Install battery box lid (WP 0033).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

FUEL PUMP ASSEMBLY CIRCUIT BREAKER REPAIR
Removal, Disassembly, Test, Assembly, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0132

Equipment Condition

TRM shut down (WP 0022)

Battery box lid removed (WP 0033)

Battery negative cable removed (WP 0056-2, steps 1 - 3)

REMOVAL

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Confirm presence of nut (Figure 1, Item 1) and removal of fuel pump negative (black) wire (Figure 1, Item 3) from battery negative cable (Figure 1, Item 2).
2. Remove nut (Figure 1, Item 6) and fuel pump buss bar (Figure 1, Item 4) from battery positive cable (Figure 1, Item 5).
3. Remove wire (Figure 1, Item 8) from circuit breaker (Figure 1, Item 7).

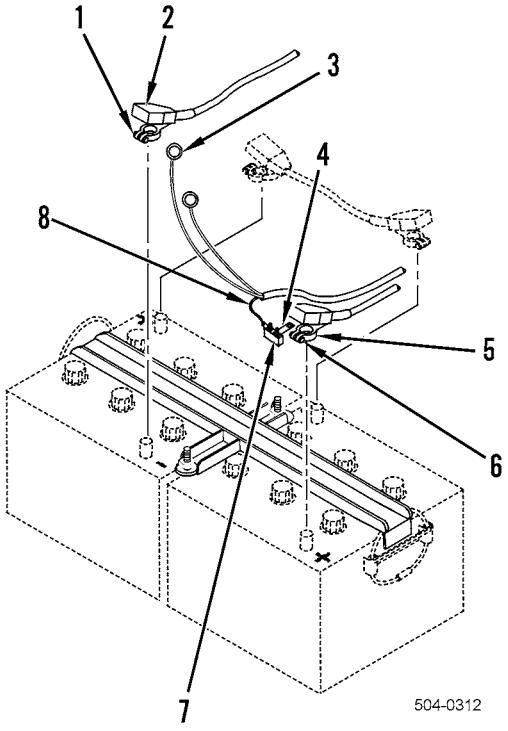
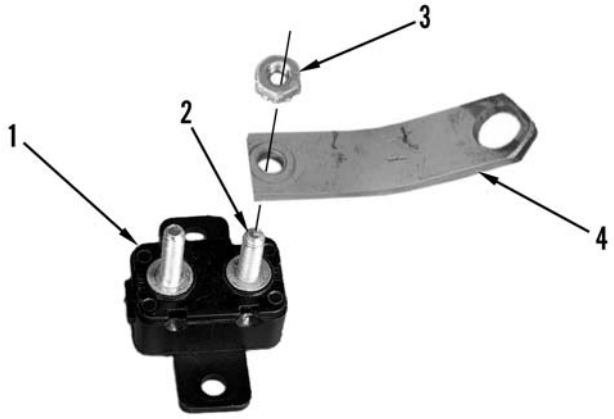


Figure 1. Batteries.

END OF TASK

DISASSEMBLY

Remove nut (Figure 2, Item 3) and buss bar (Figure 2, Item 4) from terminal (Figure 2, Item 2) marked “BAT” of circuit breaker (Figure 2, Item 1).



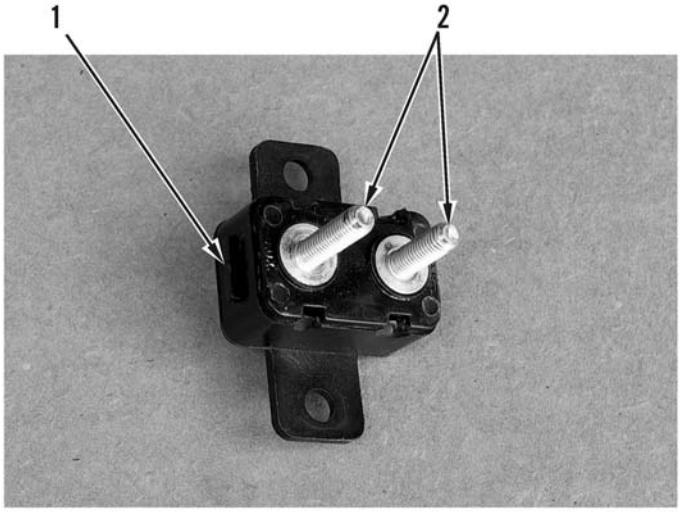
504-0269

Figure 2. Circuit Breaker and Buss Bar.

END OF TASK

TEST

1. Press in reset button (Figure 3, Item 1).
2. Put multimeter leads on two terminals (Figure 3, Item 2) and check for continuity.
3. If there is no continuity, replace circuit breaker.



504-0270

Figure 3. Continuity Test.

END OF TASK

ASSEMBLY

Install buss bar (Figure 2, Item 4) and nut (Figure 2, Item 3) on terminal (Figure 2, Item 2) marked “BAT” of circuit breaker (Figure 2, Item 1).

END OF TASK

INSTALLATION

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Install wire (Figure 4, Item 8) on circuit breaker (Figure 4, Item 7).
2. Connect fuel pump buss bar (Figure 4, Item 4) to battery positive cable (Figure 4, Item 5).
3. Install nut (Figure 4, Item 6) on battery positive cable (Figure 4, Item 5).
4. Connect fuel pump negative (black) wire (Figure 4, Item 3) to battery negative cable (Figure 4, Item 2).
5. Install nut (Figure 4, Item 1) on battery negative cable (Figure 4, Item 2).

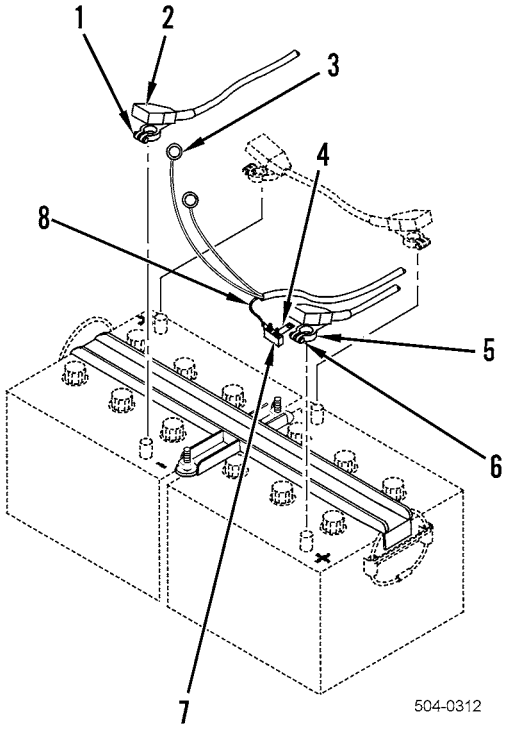


Figure 4. Batteries.

6. Connect battery negative cable (WP 0056-6, steps 16, 18 - 20).
7. Install battery box lid (WP 0033).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

BOTTOM LOAD VALVE PIPING ASSEMBLY REPAIR
Disassembly, Assembly

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)
Petrolatum, technical (WP 0153, Item 15)
Gasket, slide (WP 0154, Item 6)
Gasket, slide (WP 0154, Item 7)
Nut, self-locking, hex (WP 0154, Item 16) (4)
Nut, self-locking, hex (WP 0154, Item 18) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

WP 0084
WP 0133

Equipment Condition

TRM drained (WP 0017)
TRM mounted on PLS trailer (WP 0013)
Battery box lid removed (WP 0033)
Battery negative cable removed (WP 0056-2, steps 1 - 3)

DISASSEMBLY

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Place drip pan under connections.
2. Remove two locknuts (Figure 1, Item 5), bolts (Figure 1, Item 1), coupling (Figure 1, Item 2), and slide gasket (Figure 1, Item 3) from inlet piping (Figure 1, Item 4). Discard locknuts and slide gasket.

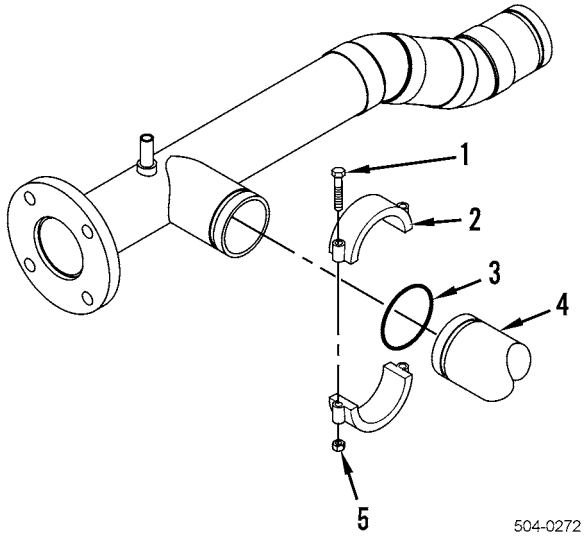


Figure 1. Inlet Piping Assembly.

DISASSEMBLY – CONTINUED

3. Remove two locknuts (Figure 2, Item 5), screws (Figure 2, Item 2), and coupling (Figure 2, Item 6) from discharge piping assembly (Figure 2, Item 4) and V2 valve (Figure 2, Item 1). Discard locknuts.
4. Remove slide gasket (Figure 2, Item 3) from discharge piping assembly (Figure 2, Item 4) and V2 valve (Figure 2, Item 1). Discard slide gasket.

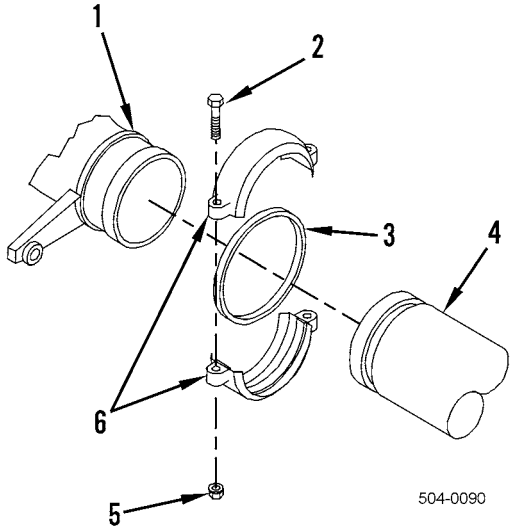


Figure 2. Bottom Load Piping Connection.

5. Disconnect line (Figure 3, Item 1) from pipe nipple (Figure 3, Item 9).
6. Remove two locknuts (Figure 3, Item 5), bolts (Figure 3, Item 3), strap (Figure 3, Item 4), and bottom load piping (Figure 3, Item 6) from strap bracket (Figure 3, Item 2). Discard locknuts.
7. Remove precheck valve (Figure 3, Item 8) and adapter (Figure 3, Item 7) from bottom load piping (Figure 3, Item 6).

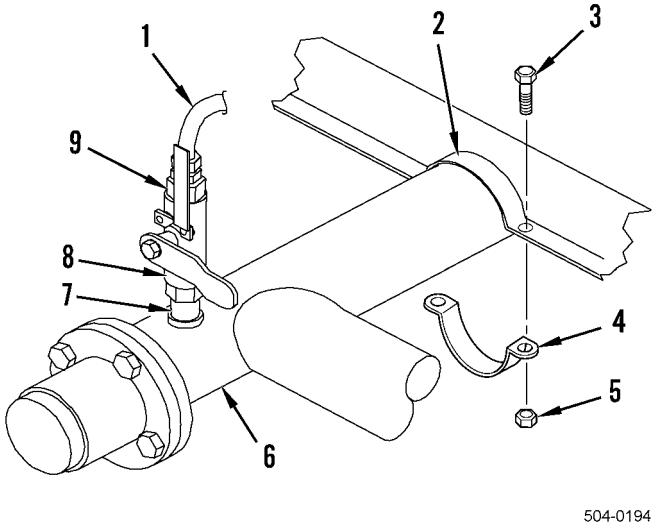


Figure 3. Bottom Load Valve Piping Assembly.

8. Remove quick disconnect coupling half (WP 0084).

END OF TASK

ASSEMBLY

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Install quick disconnect coupling half (WP 0084).
2. Install precheck valve (Figure 4, Item 8) and adapter (Figure 4, Item 7) on bottom load piping (Figure 4, Item 6).
3. Install bottom load piping (Figure 4, Item 6), strap (Figure 4, Item 4), two bolts (Figure 4, Item 3), and locknuts (Figure 4, Item 5) on strap bracket (Figure 4, Item 2).

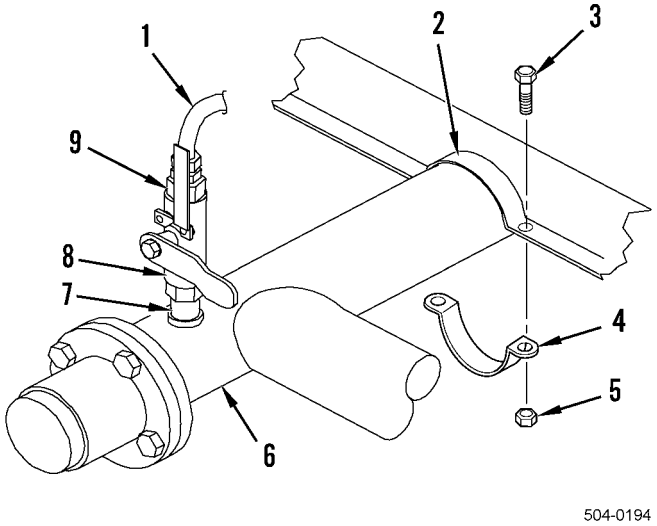


Figure 4. Bottom Load Valve Piping Assembly.

ASSEMBLY – CONTINUED

4. Lightly lubricate inner surface of rigid couplings (Figure 5, Item 6) with petrolatum.
5. Install new slide gasket (Figure 5, Item 3) on bottom load valve (Figure 5, Item 1).
6. Install coupling (Figure 5, Item 6), two bolts (Figure 5, Item 2) and new locknuts (Figure 5, Item 5) on bottom load valve (Figure 5, Item 1) and valve piping assembly (Figure 5, Item 4).

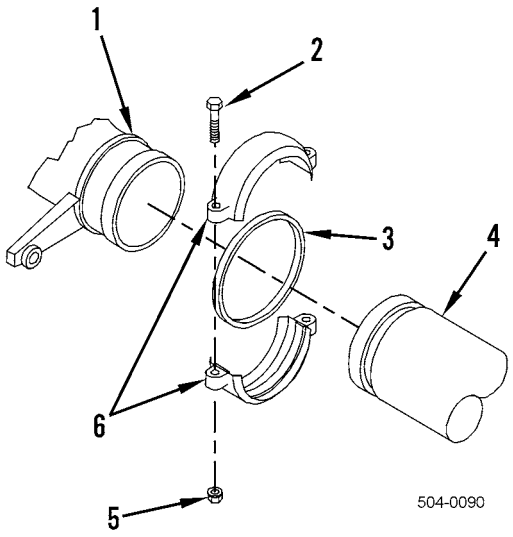


Figure 5. Bottom Load Piping Connection.

7. Move new slide gasket (Figure 6, Item 3) into position and install coupling (Figure 6, Item 2), two bolts (Figure 6, Item 1), and new locknuts (Figure 6, Item 5) onto inlet piping assembly (Figure 6, Item 4).

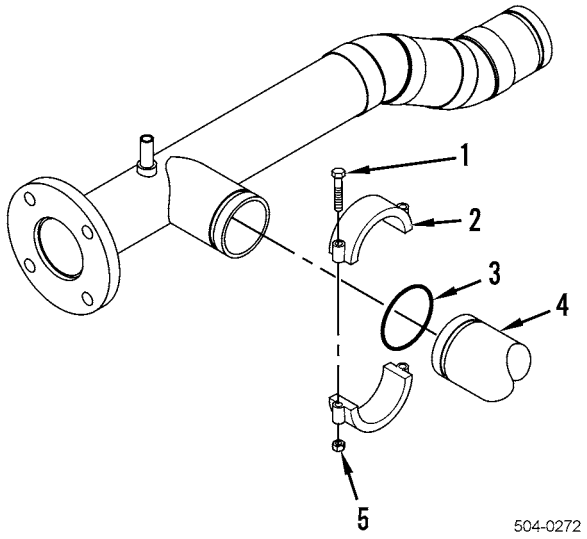


Figure 6. Inlet Piping Assembly.

8. Connect line (Figure 4, Item 1) to pipe nipple (Figure 4, Item 9).

ASSEMBLY – CONTINUED

9. Remove drip pans and dispose of contents per local procedures.
10. Add fuel and check for leaks.
11. Connect battery negative cable (WP 0056-6, steps 15 - 20).
12. Install battery box lid (WP 0033).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

PORT B VACUUM BREAKER REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Sealing compound (WP 0153, Item 17)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0133

Equipment Condition

V5 discharge port B control valve closed
Fuel drained from port B vacuum breaker

REMOVAL

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Remove vacuum breaker valve (Figure 1, Item 3) from pipe (Figure 1, Item 2).
2. Remove elbow (Figure 1, Item 4) from vacuum breaker valve (Figure 1, Item 3).
3. Remove pipe (Figure 1, Item 2) from Port B (Figure 1, Item 1).

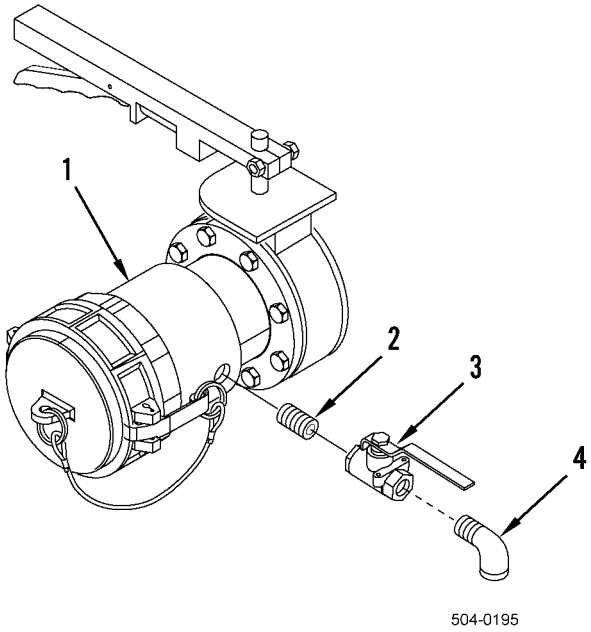


Figure 1. Port B Vacuum Breaker.

END OF TASK

INSTALLATION

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.
- Goggles and gloves must be worn when working with sealing compound. Avoid contact with eyes and skin. Avoid breathing vapors and ensure there is adequate ventilation. If sealing compound contacts eyes, flush eyes with cold water for at least 15 minutes and seek immediate medical attention. If sealing compound contacts skin, wash skin thoroughly with soap and water. Failure to comply could result in injury to personnel.

1. Apply sealing compound on threads and install pipe (Figure 1, Item 2) on Port B (Figure 1, Item 1).
2. Apply sealing compound on threads and install vacuum breaker valve (Figure 1, Item 3) on pipe (Figure 1, Item 2).
3. Apply sealing compound on threads and install elbow (Figure 1, Item 4) on vacuum breaker valve (Figure 1, Item 3).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

PRECHECK VALVE REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)
Sealing compound (WP 0153, Item 17)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0133

Equipment Condition

TRM shut down (WP 0022)
TRM drained (WP 0017)
V2 valve closed

REMOVAL

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Place drip pan under precheck valve (Figure 1, Item 3).
2. Remove two screws (Figure 1, Item 5) securing ID plate (Figure 1, Item 4) from precheck valve (Figure 1, Item 3).
3. Remove ID plate (Figure 1, Item 4).
4. Disconnect line fitting (Figure 1, Item 1) from nipple (Figure 1, Item 2) and precheck valve (Figure 1, Item 3).
5. Open precheck valve slightly to relieve pressure.
6. Remove precheck valve (Figure 1, Item 3) and adapter (Figure 1, Item 6) from bottom load piping (Figure 1, Item 7).
7. Remove nipple (Figure 1, Item 2) from precheck valve (Figure 1, Item 3).
8. Remove adapter (Figure 1, Item 6) from precheck valve (Figure 1, Item 3).

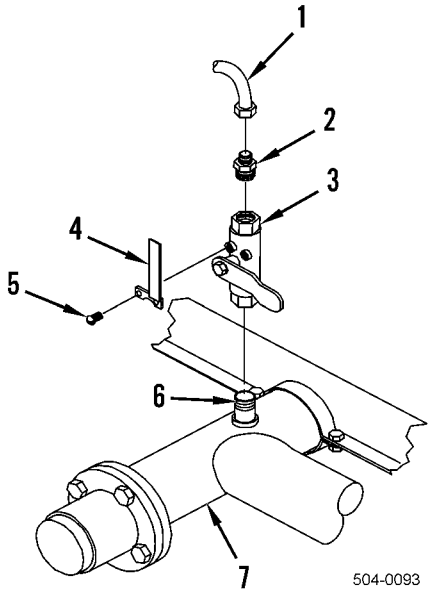


Figure 1. Precheck Valve.

END OF TASK

INSTALLATION

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.
- Goggles and gloves must be worn when working with sealing compound. Avoid contact with eyes and skin. Avoid breathing vapors and ensure there is adequate ventilation. If sealing compound contacts eyes, flush eyes with cold water for at least 15 minutes and seek immediate medical attention. If sealing compound contacts skin, wash skin thoroughly with soap and water. Failure to comply could result in injury to personnel.

1. Apply sealing compound to threads of nipple (Figure 1, Item 2) and adapter (Figure 1, Item 6).
2. Install adapter (Figure 1, Item 6) on precheck valve (Figure 1, Item 3).
3. Install nipple (Figure 1, Item 2) in precheck valve (Figure 1, Item 3).
4. Install precheck valve (Figure 1, Item 3) on bottom load piping (Figure 1, Item 7).
5. Connect line fitting (Figure 1, Item 1) to pipe nipple (Figure 1, Item 2).
6. Position ID plate (Figure 1, Item 4) on precheck valve (Figure 1, Item 3).
7. Install two screws (Figure 1, Item 5) and ID plate (Figure 1, Item 4) to precheck valve (Figure 1, Item 3).
8. Remove drip pan and dispose of contents per local procedures.
9. Add fuel and check for leaks.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

QUICK DISCONNECT COUPLING HALF REPLACEMENT
Removal, Clean, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Wrench, torque, 0-175 lb-ft (WP 0151, Item 7)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)
Nut, self-locking, hex (WP 0154, Item 15) (4)
Gasket, non-asbestos (WP 0154, Item 9)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0133

Equipment Condition

TRM shut down (WP 0022)
TRM drained (WP 0017)

REMOVAL

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Place drip pan under quick disconnect coupling half (Figure 1, Item 4).
2. Remove vapor recovery dust cap and open V2 valve.
3. Remove four locknuts (Figure 1, Item 1) from screws (Figure 1, Item 5) on bottom load piping (Figure 1, Item 2). Discard locknuts.
4. Remove four screws (Figure 1, Item 5) from quick disconnect coupling half (Figure 1, Item 4) and bottom load piping (Figure 1, Item 2).
5. Remove quick disconnect coupling half (Figure 1, Item 4) from bottom load piping (Figure 1, Item 2).
6. Remove gasket (Figure 1, Item 3) and discard.

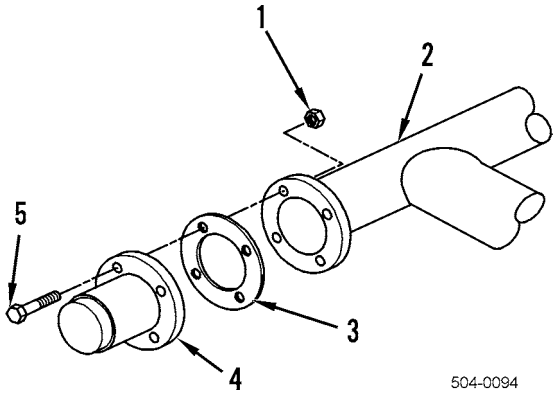


Figure 1. Quick Disconnect Coupling Half.

END OF TASK

CLEAN

WARNING

Wear goggles to prevent foreign objects from entering your eyes. Failure to comply could result in an eye injury.

1. Remove gasket debris from mating surfaces.
2. Clean all metallic parts with cleaning cloth and solvent cleaning compound.
3. Allow parts to dry thoroughly.

END OF TASK

INSTALLATION

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Position new gasket (Figure 1, Item 3) on mating surface of bottom load piping (Figure 1, Item 2).
2. Install quick disconnect coupling half (Figure 1, Item 4) on bottom load piping (Figure 1, Item 2).
3. Install screws (Figure 1, Item 5) in quick disconnect coupling half (Figure 1, Item 4) and bottom load piping (Figure 1, Item 2).
4. Install four new locknuts (Figure 1, Item 1) on screws (Figure 1, Item 5). Torque to 30 lb-ft (40.7 Nm).
5. Close V2 valve and install vapor recovery dust cap.
6. Remove drip pan and dispose of contents per local procedures.
7. Add fuel and check for leaks.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

INLET PIPING ASSEMBLY REPAIR
Disassembly, Clean, Assembly

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)
Wrench, torque, 0-175 lb-ft (WP 0151, Item 7)

Materials/Parts

Cleaning compound, solvent (WP 0153, Item 2)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)
Petrolatum, technical (WP 0153, Item 15)
Loctite sealant 515 (WP 0153, Item 11)
Gasket-3, flange (WP 0154, Item 4)
Gasket, slide (WP 0154, Item 7)
Nut, self-locking, hex (WP 0154, Item 18) (22)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

WP 0133

Equipment Condition

TRM shut down (WP 0022)
TRM drained (WP 0017)
Battery box removed (WP 0057)
Ladder removed (WP 0042)
Right hand emergency stop cable guide removed (WP 0095)
Left hand emergency stop cable guide removed (WP 0094)
Inlet piping assembly butterfly valve levers removed (WP 0086)

DISASSEMBLY

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

DISASSEMBLY – CONTINUED

1. Open manhole cover to relieve pressure.
2. Place drip pan under Port B (Figure 1, Item 6) and bottom load valve piping (Figure 1, Item 1).
3. Remove eight locknuts (Figure 1, Item 2), bolts (Figure 1, Item 7), 16 washers (Figure 1, Item 8), Port B (Figure 1, Item 6), gasket (Figure 1, Item 5), butterfly valve (Figure 1, Item 4), and gasket (Figure 1, Item 3) from bottom load valve piping (Figure 1, Item 1). Discard locknuts and gaskets.

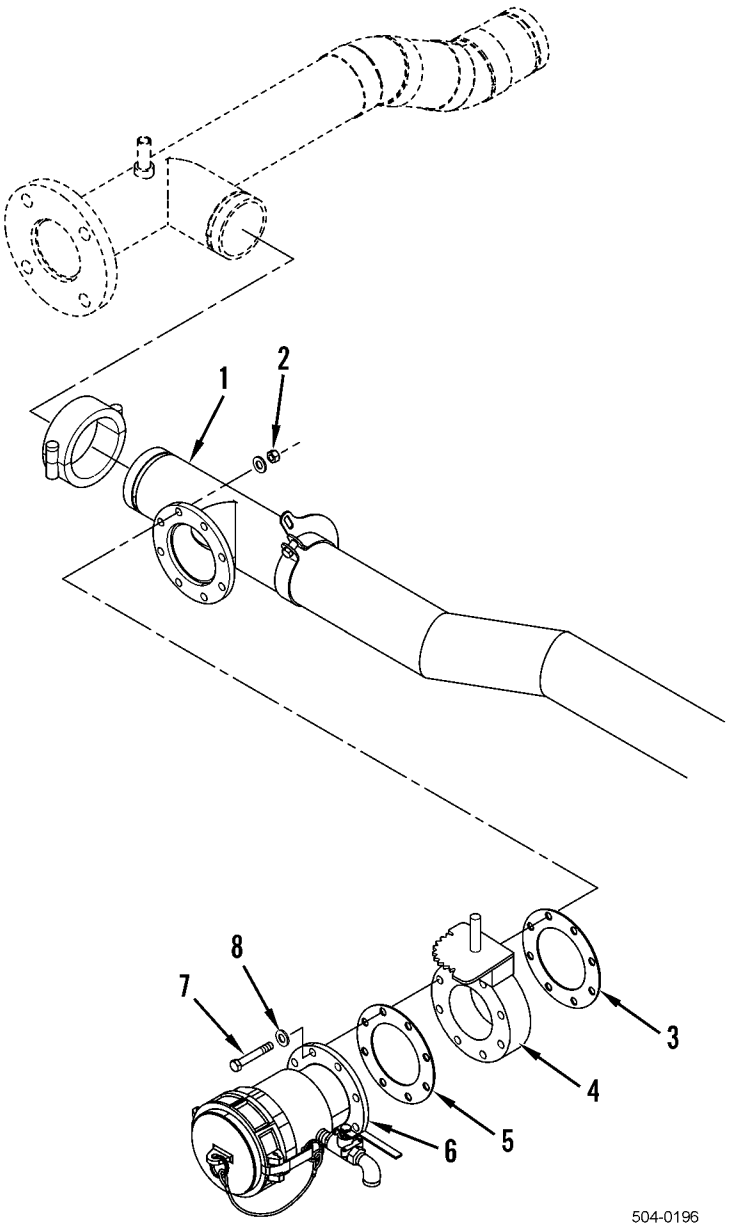


Figure 1. Port B Butterfly Valve.

DISASSEMBLY – CONTINUED

4. Remove 8 locknuts (Figure 2, Item 6), bolts (Figure 2, Item 8), 16 washers (Figure 2, Item 7), Port G (Figure 2, Item 5), gasket (Figure 2, Item 4), butterfly valve (Figure 2, Item 3), and gasket (Figure 2, Item 2) from bottom load valve piping (Figure 2, Item 1). Discard locknuts and gaskets.

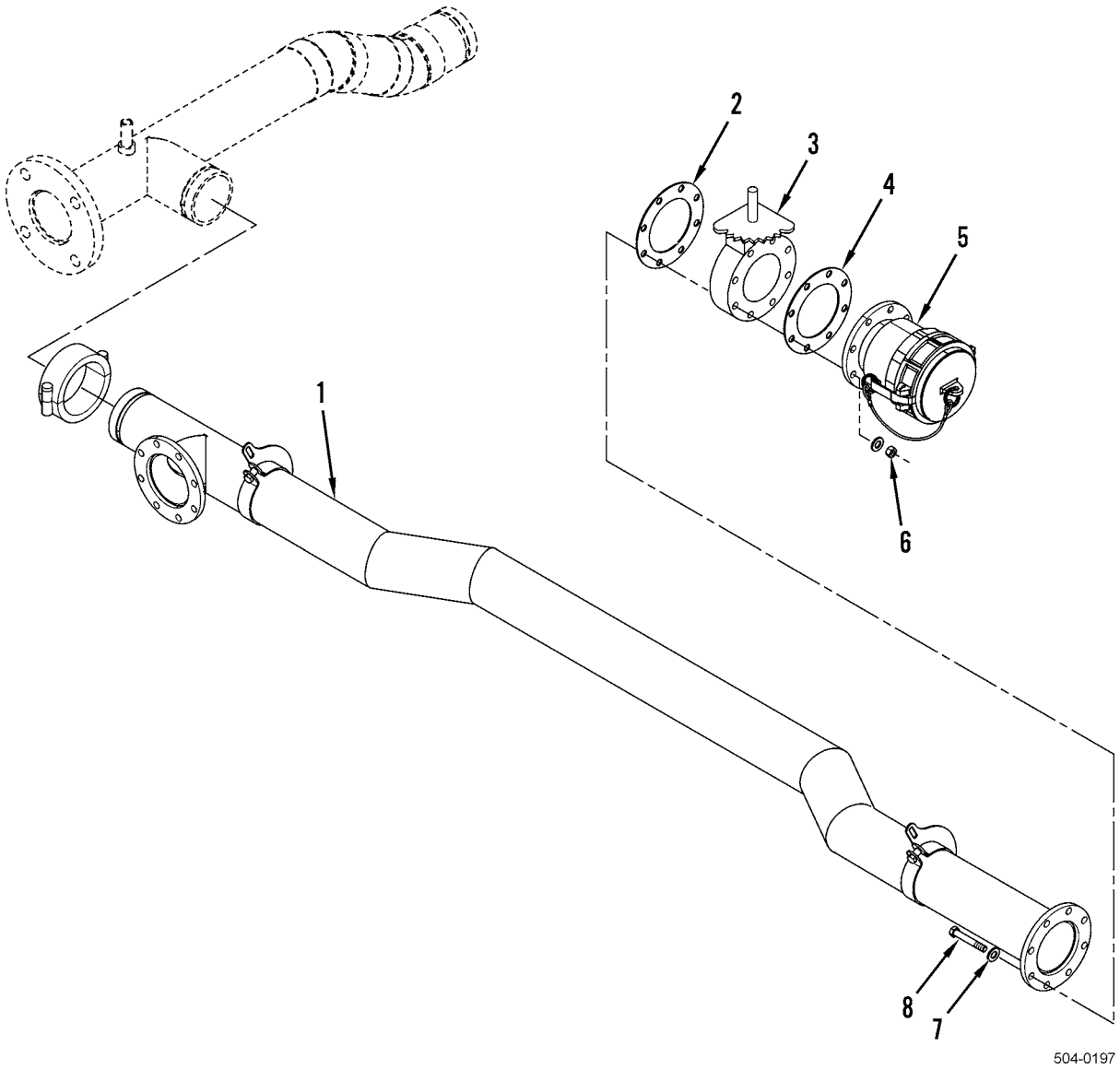


Figure 2. Port G Butterfly Valve.

DISASSEMBLY – CONTINUED

5. Remove two locknuts (Figure 3, Item 7), bolts (Figure 3, Item 10), coupling (Figure 3, Item 9), and slide gasket (Figure 3, Item 8) from bottom load valve piping (Figure 3, Item 1). Discard locknuts and gasket.

NOTE

- To remove bottom valve piping, move piping forward and rotate as necessary.
- It may be necessary to remove all wires from NATO slave base.

6. Remove eight locknuts (Figure 3, Item 3), bolts (Figure 3, Item 2), washers (Figure 3, Item 4), two straps (Figure 3, Item 6), brackets (Figure 3, Item 5) and bottom load valve piping (Figure 3, Item 1) from TRM. Discard locknuts.

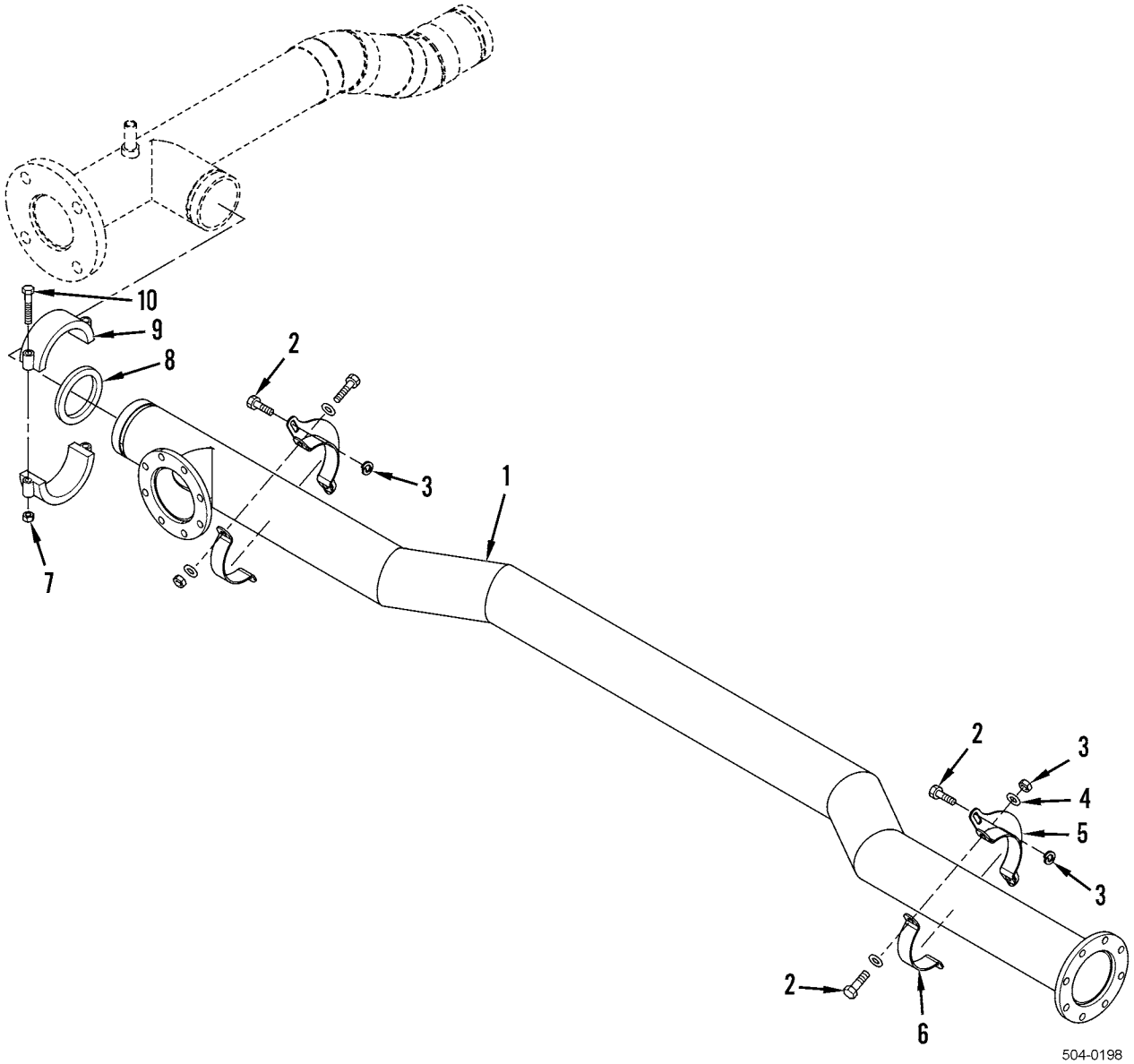


Figure 3. Bottom Load Valve Piping.

END OF TASK

CLEAN

WARNING

Wear goggles to prevent foreign objects from entering your eyes. Failure to comply could result in an eye injury.

1. Remove gasket debris from mating surfaces.
2. Clean all metallic parts with cleaning cloth and solvent cleaning compound.
3. Allow parts to dry thoroughly.

END OF TASK

ASSEMBLY

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

NOTE

- To install bottom valve piping, insert rearward end first and twist as necessary.
- Install wires in NATO slave base if removed.
- Do not tighten hardware until piping is properly aligned and slide gasket is properly positioned.

1. Position bottom load valve piping (Figure 3, Item 1) on TRM.
2. Install new slide gasket (Figure 3, Item 8) using petrolatum on bottom load valve (Figure 3, Item 1).
3. Install two brackets (Figure 3, Item 5), straps (Figure 3, Item 6), eight washers (Figure 3, Item 4), bolts (Figure 3, Item 2), and new locknuts (Figure 3, Item 3) on bottom load valve piping (Figure 3, Item 1).
4. Install new coupling (Figure 3, Item 9), two bolts (Figure 3, Item 10), and new locknuts (Figure 3, Item 7) on bottom load valve piping (Figure 3, Item 1).

ASSEMBLY – CONTINUED

WARNING

Goggles and gloves must be worn when working with sealing compound. Avoid contact with eyes and skin. Avoid breathing vapors and ensure there is adequate ventilation. If sealing compound contacts eyes, flush with cold water for at least 15 minutes and seek immediate medical attention. If sealing compound contacts skin, wash skin thoroughly with soap and water. Failure to comply could result in injury to personnel.

5. Install new gasket (Figure 4, Item 2) with sealing compound, butterfly valve (Figure 4, Item 3), new gasket (Figure 4, Item 4) with sealing compound, Port G (Figure 4, Item 5), 16 washers (Figure 4, Item 7), 8 bolts (Figure 4, Item 8), and locknuts (Figure 4, Item 6) on bottom load valve piping (Figure 4, Item 1). Torque bolts to 27-33 lb-ft (37-45 Nm).

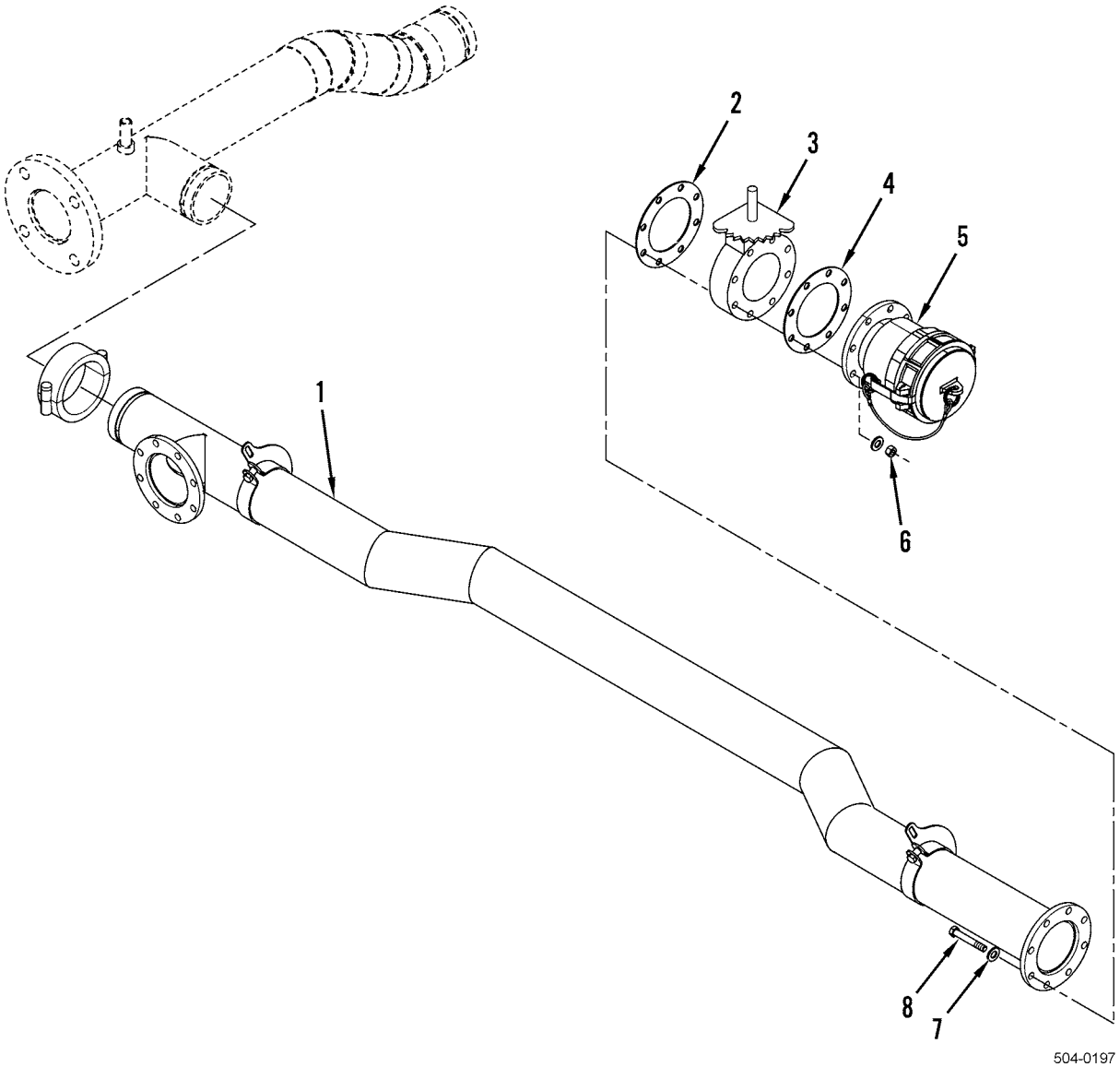


Figure 4. Port G Butterfly Valve.

ASSEMBLY – CONTINUED

6. Install new gasket (Figure 5, Item 3) with sealing compound, butterfly valve (Figure 5, Item 4), new gasket (Figure 5, Item 5) with sealing compound, Port B (Figure 5, Item 6), 16 washers (Figure 5, Item 8), 8 bolts (Figure 5, Item 7), and locknuts (Figure 5, Item 2) on bottom load valve piping (Figure 5, Item 1). Torque bolts to 27-33 lb-ft (37-45 Nm).

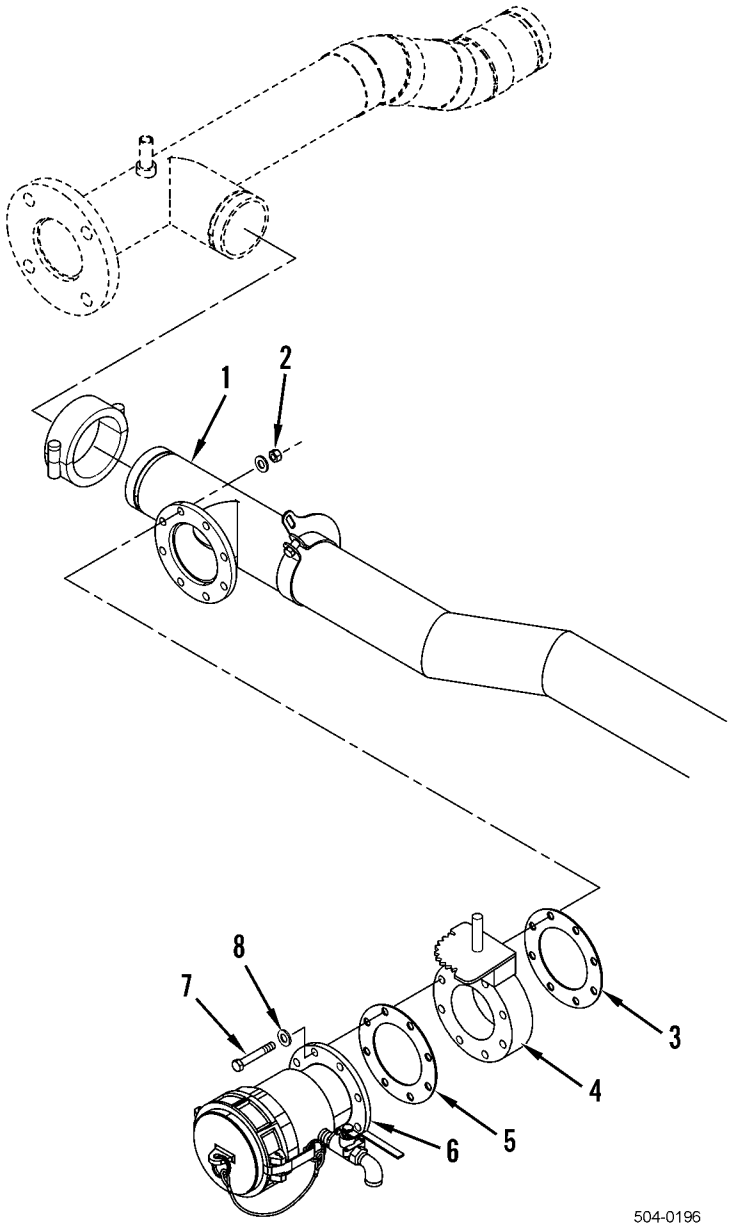


Figure 5. Port B Butterfly Valve.

ASSEMBLY – CONTINUED

7. Install inlet piping assembly butterfly valve levers (WP 0086).
8. Install right hand emergency stop cable guide (WP 0095).
9. Install left hand emergency stop cable guide (WP 0094).
10. Install ladder (WP 0042).
11. Install battery box (WP 0057).
12. Close manhole cover.
13. Remove drain pan and dispose of contents per local procedures.
14. Add fuel and check for leaks.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

INLET PIPING ASSEMBLY BUTTERFLY VALVE LEVER REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0133

Equipment Condition

TRM shut down (WP 0022)

REMOVAL

1. Remove nut (Figure 1, Item 3) and bolt (Figure 1, Item 1) from manual control lever (Figure 1, Item 2).
2. Remove manual control lever (Figure 1, Item 2) from flow control valve shaft (Figure 1, Item 4).

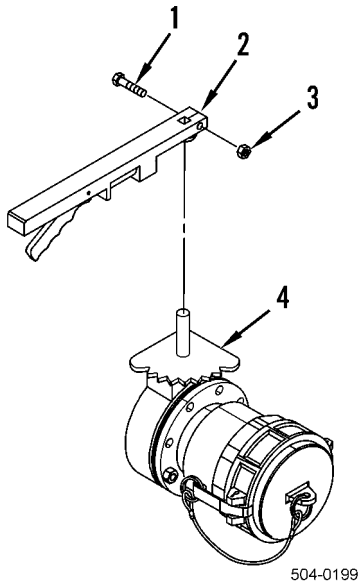


Figure 1. Flow Control Valve.

END OF TASK

INSTALLATION

1. Install manual control lever (Figure 1, Item 2) on flow control valve shaft (Figure 1, Item 4).
2. Install bolt (Figure 1, Item 1) and nut (Figure 1, Item 3) on manual control lever (Figure 1, Item 2).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

V2 VALVE REPLACEMENT
Removal, Clean, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)
Wrench, torque, 0-175 lb-ft (WP 0151, Item 7)
3/4 in. crowfoot attachment, socket wrench, 3/8 in. drive (WP 0151, Item 1)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Loctite sealant 515 (WP 0153, Item 11)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)
Petrolatum, technical (WP 0153, Item 15)
Gasket (WP 0154, Item 3)
Gasket-sump, 3 in. (WP 0154, Item 8)

Materials/Parts - Continued

Nut, self-locking, hex (WP 0154, Item 13) (6)
Nut, self-locking, hex (WP 0154, Item 17) (8)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

WP 0134

Equipment Condition

TRM shut down (WP 0022)
TRM drained (WP 0017)
TRM mounted on PLS trailer (WP 0013)
Bottom load piping assembly removed (WP 0081)

REMOVAL

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

REMOVAL – CONTINUED

1. Open manhole cover to relieve pressure.
2. Place drip pan under connections.
3. Remove vent valve assembly:
   a. Remove loop clamp (Figure 1, Item 4) securing vent hood (Figure 1, Item 1) to vent valve (Figure 1, Item 5).
   b. Loosen hose clamp (Figure 1, Item 2) securing vent hood (Figure 1, Item 1) to vapor recovery piping assembly (Figure 1, Item 3).
   c. Slide hose clamp (Figure 1, Item 2) onto vapor recovery piping assembly (Figure 1, Item 3).
   d. Remove vent hood (Figure 1, Item 1).

NOTE

Two old locknuts are used in installation for alignment purposes.

   e. Remove eight locknuts (Figure 1, Item 8). Discard six locknuts.
   f. Lift vent valve (Figure 1, Item 5) from studs (Figure 1, Item 7).
   g. Remove and discard gasket (Figure 1, Item 6).

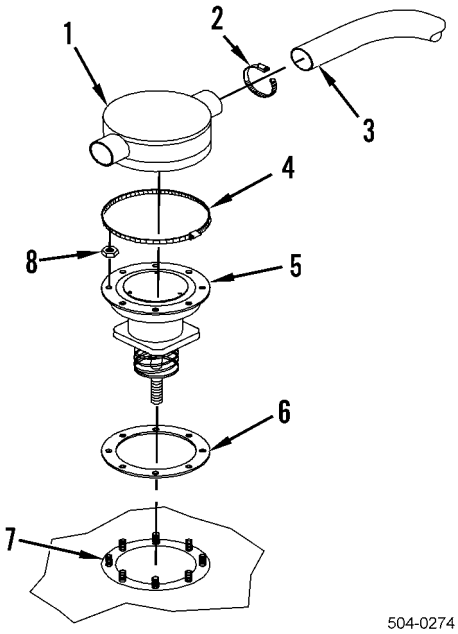


Figure 1. Vent Valve Assembly.

REMOVAL – CONTINUED

4. Using wrench, hold nut (Figure 2, Item 1) and remove union (Figure 2, Item 2) from cable guide (Figure 2, Item 3).

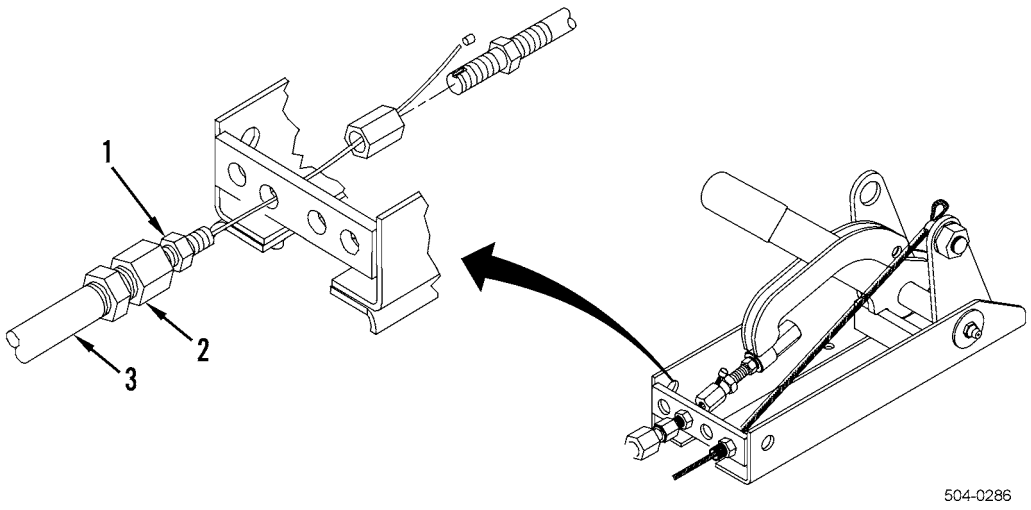


Figure 2. Cable Guide Union.

REMOVAL – CONTINUED

5. Remove cable from V2 valves:
   a. Loosen nuts (Figure 3, Item 7) on clamp (Figure 3, Item 1), securing cable (Figure 3, Item 6) on valve handle (Figure 3, Item 2).
   b. Loosen threaded bushing (Figure 3, Item 5) from V2 valve (Figure 3, Item 3).
   c. Remove cable guide (Figure 3, Item 4) and cable (Figure 3, Item 6) from V2 valve (Figure 3, Item 3).

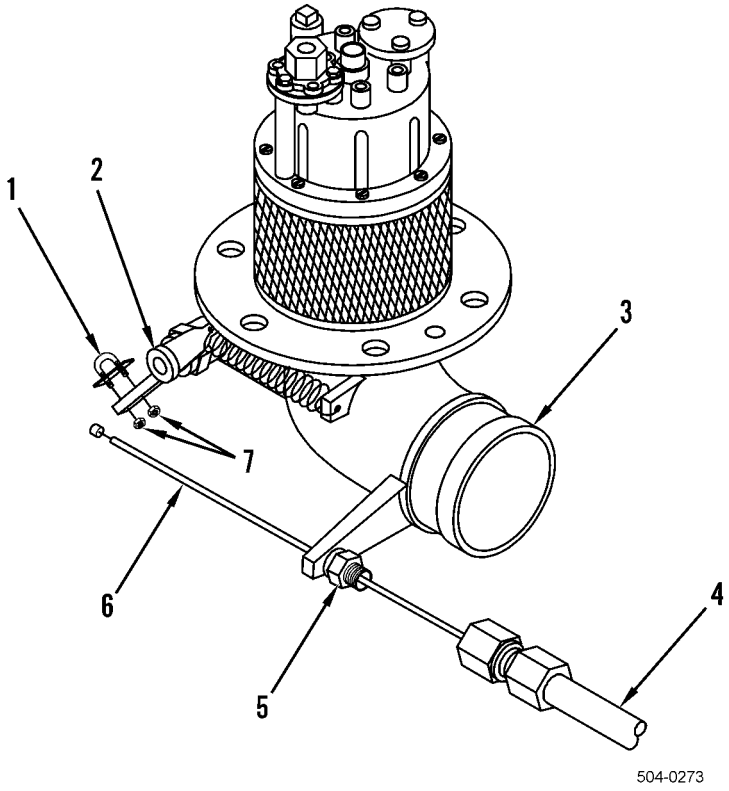


Figure 3. V2 Valve.

REMOVAL – CONTINUED

6. Remove six locknuts (Figure 4, Item 8) securing V2 valve (Figure 4, Item 9) to tank (Figure 4, Item 1). Discard locknuts.
7. Lower V2 valve (Figure 4, Item 9) and gasket (Figure 4, Item 3) from tank (Figure 4, Item 1).
8. Disconnect input (red) (Figure 4, Item 7) and output (blue) (Figure 4, Item 4) hoses.
9. Remove V2 valve (Figure 4, Item 9) and gasket (Figure 4, Item 3) from tank (Figure 4, Item 1).
10. Remove input elbow (Figure 4, Item 6) and output elbow (Figure 4, Item 5) from V2 valve (Figure 4, Item 9).

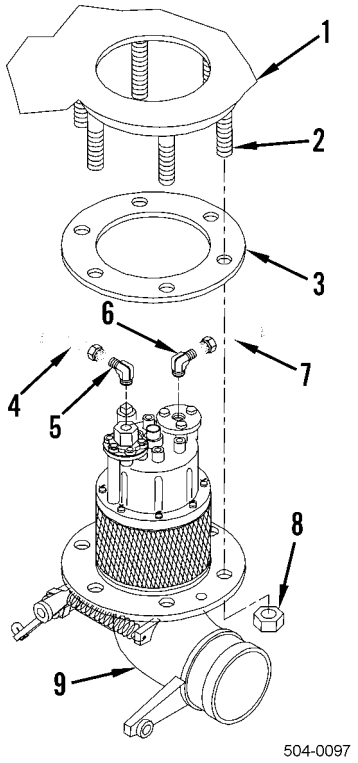


Figure 4. V2 Valve.

END OF TASK

CLEAN

WARNING

Wear goggles to prevent foreign objects from entering your eyes. Failure to comply could result in an eye injury.

Remove any gasket debris from mating surface.

END OF TASK

INSTALLATION

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel.
- Wet metal surfaces are slippery. Use caution when climbing on tank.
- Ground self and equipment before opening manhole cover to prevent explosion caused by electrostatic charge.
- Open manhole cover slowly to relieve pressure and to prevent fuel from being sprayed into face.
- Failure to comply could result in injury or death to personnel.

1. Install input elbow (Figure 5, Item 6) and output elbow (Figure 5, Item 5) on V2 valve (Figure 5, Item 9).

WARNING

Goggles and gloves must be worn when working with sealing compound. Avoid contact with eyes and skin. Avoid breathing vapors and ensure there is adequate ventilation. If sealing compound contacts eyes, flush eyes with cold water for at least 15 minutes and seek immediate medical attention. If sealing compound contacts skin, wash skin thoroughly with soap and water. Failure to comply could result in injury to personnel.

2. Position V2 valve (Figure 5, Item 9) and gasket (Figure 5, Item 3) with sealing compound on studs (Figure 5, Item 2) on tank (Figure 5, Item 1).
3. Connect input (red) (Figure 5, Item 7) and output (blue) (Figure 5, Item 4) hoses.

NOTE

If studs were removed with locknuts, apply sealing compound to threads of studs before installation.

4. Install six new locknuts (Figure 5, Item 8) securing V2 valve (Figure 5, Item 9) to tank (Figure 5, Item 1). Torque locknuts to 30 lb-ft (40.7 Nm).

INSTALLATION – CONTINUED

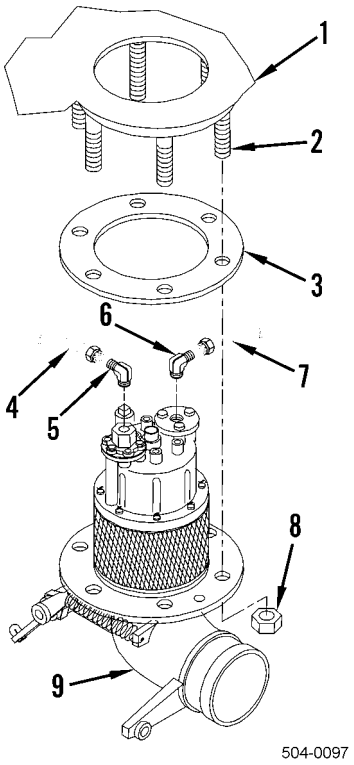


Figure 5. V2 Valve.

INSTALLATION – CONTINUED

5. Install cable to V2 valves:
   a. Install cable guide (Figure 6, Item 4) and cable (Figure 6, Item 6) on V2 valve (Figure 6, Item 3).
   b. Tighten threaded bushing (Figure 6, Item 5) on V2 valve (Figure 6, Item 3).
   c. Tighten nuts (Figure 6, Item 7) on clamp (Figure 6, Item 1) securing cable (Figure 6, Item 6) on valve handle (Figure 6, Item 2).

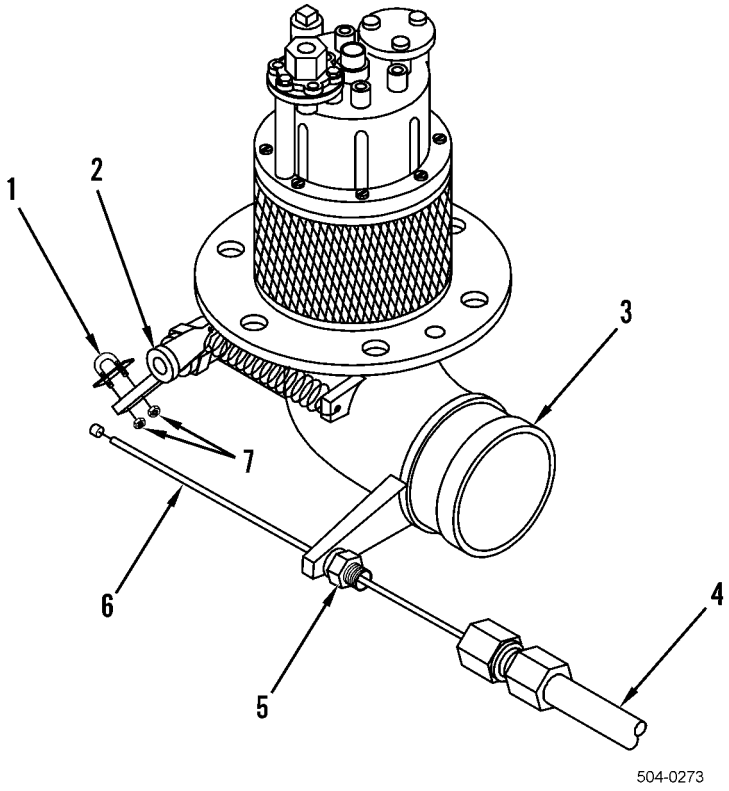


Figure 6. V2 Valve.

INSTALLATION – CONTINUED

6. Holding nut (Figure 7, Item 1) attach union (Figure 7, Item 2) to cable guide (Figure 7, Item 3).

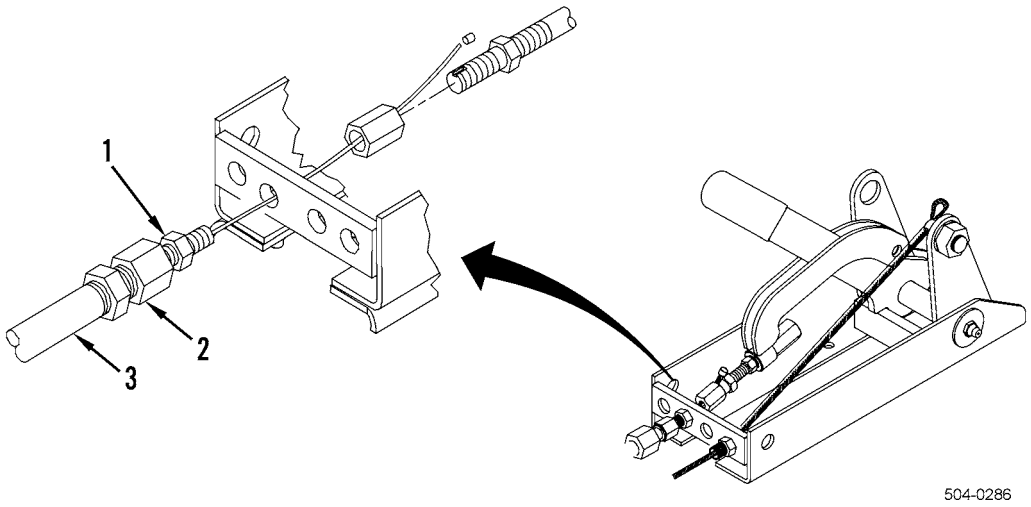


Figure 7. Cable Guide Union.

INSTALLATION – CONTINUED

WARNING

Goggles and gloves must be worn when working with sealing compound. Avoid contact with eyes and skin. Avoid breathing vapors and ensure there is adequate ventilation. If sealing compound contacts eyes, flush eyes with cold water for at least 15 minutes and seek immediate medical attention. If sealing compound contacts skin, wash skin thoroughly with soap and water. Failure to comply could result in injury to personnel.

7. Install vent valve assembly:
   a. Install new gasket (Figure 8, Item 6) with sealing compound.
   b. Install vent valve (Figure 8, Item 5) on studs (Figure 8, Item 7) and snugly install two old locknuts (Figure 8, Item 8) across from each other.
   c. Tighten locknuts (Figure 8, Item 8) securing vent valve (Figure 8, Item 5).
   d. Have assistant open and close V2 valve while observing vent valve (Figure 8, Item 5).

NOTE

The vent valve should open and close, confirming vent valve is properly aligned with internal valve center piston. If vent does not open and close, repeat steps 6a - 6c until vent valve opens and closes properly.

   e. Install six new locknuts (Figure 8, Item 8) on studs (Figure 8, Item 7). Tighten new locknuts.
   f. Remove two old locknuts (Figure 8, Item 8) and discard.
   g. Install two remaining new locknuts (Figure 8, Item 8) on studs (Figure 8, Item 7) to vent valve (Figure 8, Item 5).
   h. Install vent hood (Figure 8, Item 1) to vent valve (Figure 8, Item 5) and connect vapor recovery piping (Figure 8, Item 3) to vent hood (Figure 8, Item 1).
   i. Install loop clamp (Figure 8, Item 4) on vent hood (Figure 8, Item 1) and tighten to secure to vent valve (Figure 8, Item 5).
   j. Slide clamp (Figure 8, Item 2) from vapor recovery piping (Figure 8, Item 3) on vent hood (Figure 8, Item 1). Tighten clamp (Figure 8, Item 2).

INSTALLATION – CONTINUED

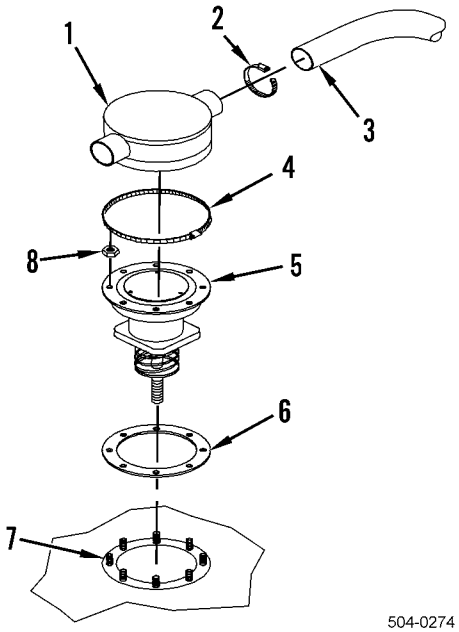


Figure 8. Vent Valve Assembly.

8. Install bottom load piping assembly (WP 0081).
9. Close manhole cover.
10. Add fuel and check for leaks.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

V1 VALVE REPLACEMENT
Removal, Clean, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)
Wrench, torque, 0-175 lb-ft (WP 0151, Item 7)

Materials/Parts

Cleaning compound, solvent (WP 0153, Item 2)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Loctite sealant 515 (WP 0153, Item 11)
Petrolatum, technical (WP 0153, Item 15)
Sealing compound (WP 0153, Item 17)
Gasket (WP 0154, Item 3)
Nut, self-locking, hex (WP 0154, Item 13) (8)
Nut, self-locking, hex (WP 0154, Item 16) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

WP 0069
WP 0135

Equipment Condition

TRM shut down (WP 0022)
TRM drained (WP 0017)
Battery negative cable removed (WP 0056-2, steps 1 - 3)
Battery box lid removed (WP 0033)
TRM mounted on PLS trailer (WP 0013)
V1 valve fusible link removed (WP 0089)
V1 valve cable guide removed (WP 0092)

REMOVAL

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Place drip pan under V1 valve (Figure 1, Item 5).
2. Remove two locknuts (Figure 1, Item 8) and screws (Figure 1, Item 6) securing coupling (Figure 1, Item 10) to discharge piping assembly (Figure 1, Item 7) and V1 valve (Figure 1, Item 5). Discard locknuts.
3. Remove coupling (Figure 1, Item 10) from discharge piping assembly (Figure 1, Item 7) and V1 valve (Figure 1, Item 5).
4. Remove slide gasket (Figure 1, Item 9) and discard if damaged.
5. If necessary, remove upper clamp on upper discharge piping assembly (WP 0069-2, *Upper Discharge Piping Assembly*, steps 4 - 6).
6. Remove eight locknuts (Figure 1, Item 4) securing V1 valve (Figure 1, Item 5) to TRM (Figure 1, Item 1). Discard locknuts.
7. Remove V1 valve (Figure 1, Item 5) from TRM (Figure 1, Item 1).
8. Remove gasket (Figure 1, Item 3) from TRM (Figure 1, Item 1) and discard.

REMOVAL – CONTINUED

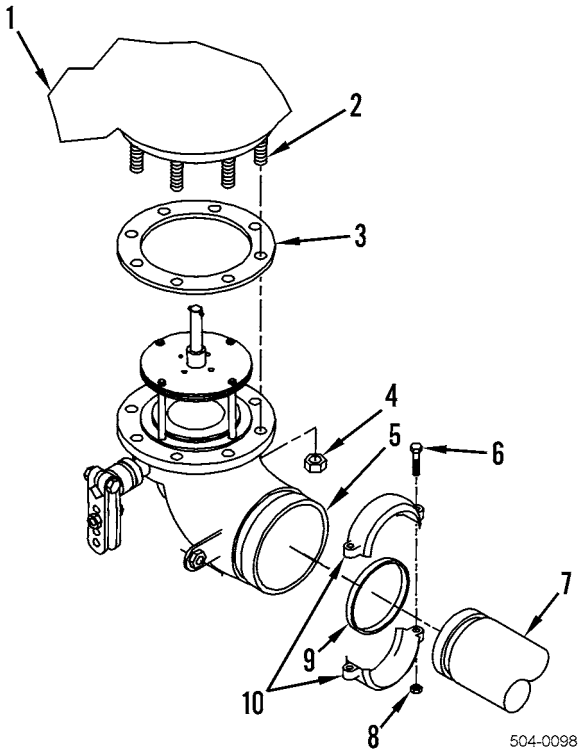
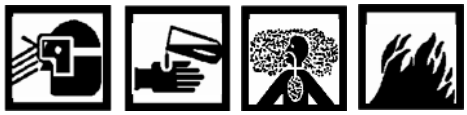


Figure 1. V1 Valve.

END OF TASK

CLEAN

WARNING



Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition. Failure to comply may cause injury or death to personnel.

1. Remove gasket debris from mating surfaces.
2. Clean all metallic parts with cleaning cloth and solvent cleaning compound.
3. Allow parts to dry thoroughly.

END OF TASK

INSTALLATION

WARNING

- Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.
- Goggles and gloves must be worn when working with sealing compound. Avoid contact with eyes and skin. Avoid breathing vapors and ensure there is adequate ventilation. If sealing compound contacts eyes, flush eyes with cold water for at least 15 minutes and seek immediate medical attention. If sealing compound contacts skin, wash skin thoroughly with soap and water. Failure to comply could result in injury to personnel.

1. Install gasket (Figure 2, Item 3) with sealing compound on studs (Figure 2, Item 2) and TRM (Figure 2, Item 1).
2. Install V1 valve (Figure 2, Item 5) on TRM (Figure 2, Item 1) and align with discharge piping assembly (Figure 2, Item 7).

NOTE

If studs were removed with locknut, apply sealing compound to threads of studs before installation.

3. Install eight new locknuts (Figure 2, Item 4) to secure V1 valve (Figure 2, Item 5) to TRM (Figure 2, Item 1). Torque locknuts to 30 lb-ft (40.7 Nm).
4. Install slide gasket (Figure 2, Item 9).
5. Lightly lubricate inner surface of couplings (Figure 2, Item 10) with petrolatum.
6. Position coupling (Figure 2, Item 10) over V1 valve (Figure 2, Item 5) and discharge piping assembly (Figure 2, Item 7) connection.
7. Install two screws (Figure 2, Item 6) and two new locknuts (Figure 2, Item 8) on coupling (Figure 2, Item 10).
8. If upper clamp on upper discharge piping assembly was removed, align piping and install upper clamp on upper discharge piping assembly (WP 0069-4, *Upper Discharge Piping Assembly,* step 2) before tightening nuts (Figure 2, Item 8).
9. Tighten nuts (Figure 2, Item 8) evenly.

INSTALLATION – CONTINUED

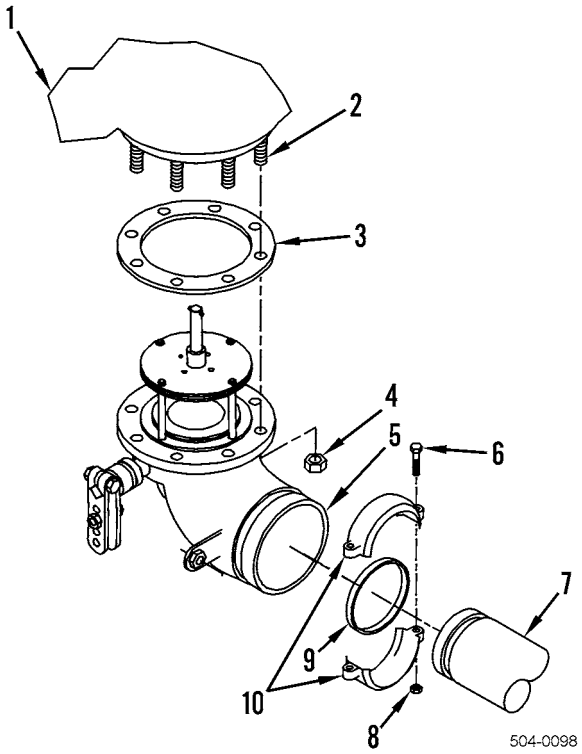


Figure 2. V1 Valve.

10. Install V1 valve fusible link (WP 0089).
11. Install V1 valve cable guide (WP 0092).
12. Remove drip pan and discard contents per local procedures.
13. Connect battery negative cable (WP 0056-6, steps 15 - 20).
14. Install battery box lid (WP 0033).
15. Add fuel and check for leaks.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

V1 VALVE FUSIBLE LINK REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Splice compression tool (WP 0151, Item 4)

Materials/Parts

Fusible link (WP 0154, Item 1)
Pin, cotter (WP 0154, Item 22)
Sleeve stop (WP 0154, Item 31)
Washer, lock (WP 0154, Item 38)
Washer, lock (WP 0154, Item 39)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0135

Equipment Condition

TRM drained (WP 0017)
TRM mounted on PLS trailer (WP 0013)

REMOVAL

1. Hold flat surface on fusible link (Figure 1, Item 7) before removing nut (Figure 1, Item 5), and remove nut (Figure 1, Item 5) and cable (Figure 1, Item 6) from fusible link (Figure 1, Item 7).
2. Remove nut (Figure 1, Item 9) and lockwasher (Figure 1, Item 13) from screw (Figure 1, Item 3) in center of lever arm (Figure 1, Item 10). Discard lockwasher.

NOTE

On some TRMs, an optional nut is used as a spacer to extend screw beyond bracket.

3. Remove screw with nut (optional) (Figure 1, Item 3) from lever arm (Figure 1, Item 10).
4. Remove cotter pin (Figure 1, Item 4) from clevis pin (Figure 1, Item 8) and discard.
5. Remove clevis pin (Figure 1, Item 8) from lever arm (Figure 1, Item 10) and fusible link (Figure 1, Item 7).
6. Remove fusible link (Figure 1, Item 7) from lever arm (Figure 1, Item 10) and discard.
7. Remove nut (Figure 1, Item 11) and lockwasher (Figure 1, Item 12) from screw (Figure 1, Item 1) at top of lever arm (Figure 1, Item 10). Discard lockwasher.
8. Remove screw (Figure 1, Item 1) from lever arm (Figure 1, Item 10).
9. Remove lever arm (Figure 1, Item 10) from V1 valve (Figure 1, Item 2).

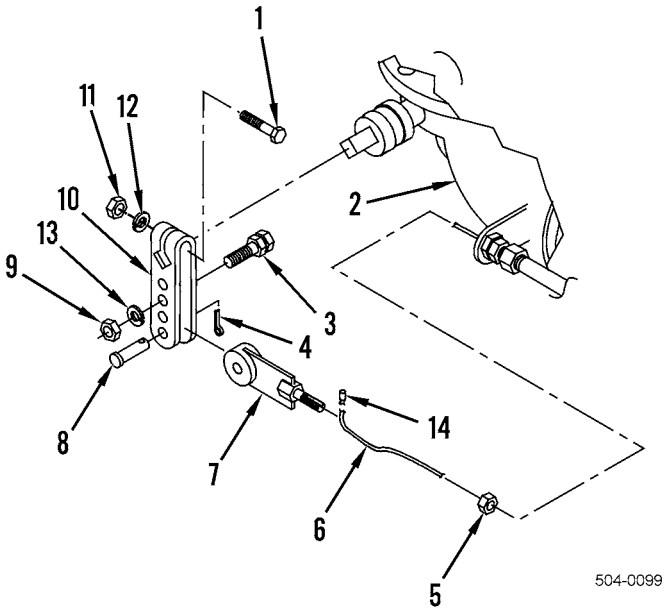


Figure 1. Fusible Link.

END OF TASK

INSTALLATION

1. Install lever arm (Figure 1, Item 10) on V1 valve (Figure 1, Item 2).
2. Install screw (Figure 1, Item 1) and new lockwasher (Figure 1, Item 12) in lever arm (Figure 1, Item 10).
3. Install nut (Figure 1, Item 11) on screw (Figure 1, Item 1) and tighten.
4. Position new fusible link (Figure 1, Item 7) between tangs on lever arm (Figure 1, Item 10).
5. Install clevis pin (Figure 1, Item 8) through lever arm (Figure 1, Item 10) and fusible link (Figure 1, Item 7).

INSTALLATION – CONTINUED

6. Install new cotter pin (Figure 1, Item 4) through clevis pin (Figure 1, Item 8).
7. Bend cotter pin (Figure 1, Item 4) to secure clevis pin (Figure 1, Item 8) in lever arm (Figure 1, Item 10).
8. Install screw with nut (optional) (Figure 1, Item 3) and new lockwasher (Figure 1, Item 13) in lever arm (Figure 1, Item 10).
9. Install nut (Figure 1, Item 9) on screw (Figure 1, Item 3) and tighten.

NOTE

Ensure V1 valve is closed.

10. Insert end of cable (Figure 1, Item 6) through nut (Figure 1, Item 5) and place in groove of threads in fusible link (Figure 1, Item 7).
11. Install nut (Figure 1, Item 5) on fusible link (Figure 1, Item 7) and hold flat surface on fusible link before tightening nut.
12. Install new stop sleeve (Figure 1, Item 14) on cable (Figure 1, Item 6).
13. Remove excess cable (Figure 1, Item 6).
14. Remove drip pans and dispose of contents per local procedures.
15. Add fuel and check for leaks.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

CONTROL LEVER ASSEMBLY (V1) REPAIR
Disassembly, Assembly

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Splice compression tool (WP 0151, Item 4)

Materials/Parts

Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Nut, self-locking, hex (WP 0154, Item 16) (4)
Nut, self-locking, hex (WP 0154, Item 18) (4)
Sleeve stop (WP 0154, Item 31) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0092
WP 0136

Equipment Condition

TRM shut down (WP 0022)
TRM drained (WP 0017)

DISASSEMBLY

1. Remove jamnut (Figure 1, Item 7), lockwasher (Figure 1, Item 6), and cable clamp bushing (Figure 1, Item 5) from trip cable clamp (Figure 1, Item 1) on control lever (Figure 1, Item 4). Discard lockwasher.
2. Remove stop sleeve (Figure 1, Item 3) from cable (Figure 1, Item 2) and discard.
3. Remove cable (Figure 1, Item 2) from trip cable clamp (Figure 1, Item 1).
4. Using wrench, hold nut (Figure 1, Item 9) and remove union (Figure 1, Item 10) from nipple (Figure 1, Item 8) and control lever assembly (Figure 1, Item 12).
5. Remove one end of cable guide (Figure 1, Item 11).

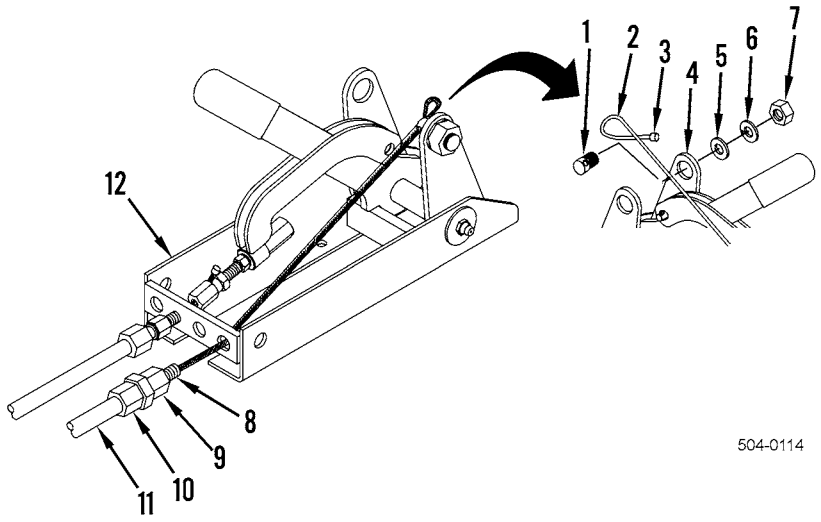


Figure 1. Control Cable and Guide.

DISASSEMBLY – CONTINUED

6. Remove clamping nut (Figure 2, Item 5) from adjusting bolt (Figure 2, Item 4).
7. Remove stop sleeve (Figure 2, Item 3) from cable (Figure 2, Item 2). Discard stop sleeve.
8. Remove clamping nut (Figure 2, Item 5) from cable (Figure 2, Item 2).
9. Using wrench, hold nut (Figure 2, Item 7) and remove union (Figure 2, Item 8) from nipple (Figure 2, Item 6).
10. Remove cable guide (Figure 2, Item 9) from control lever body (Figure 2, Item 1).

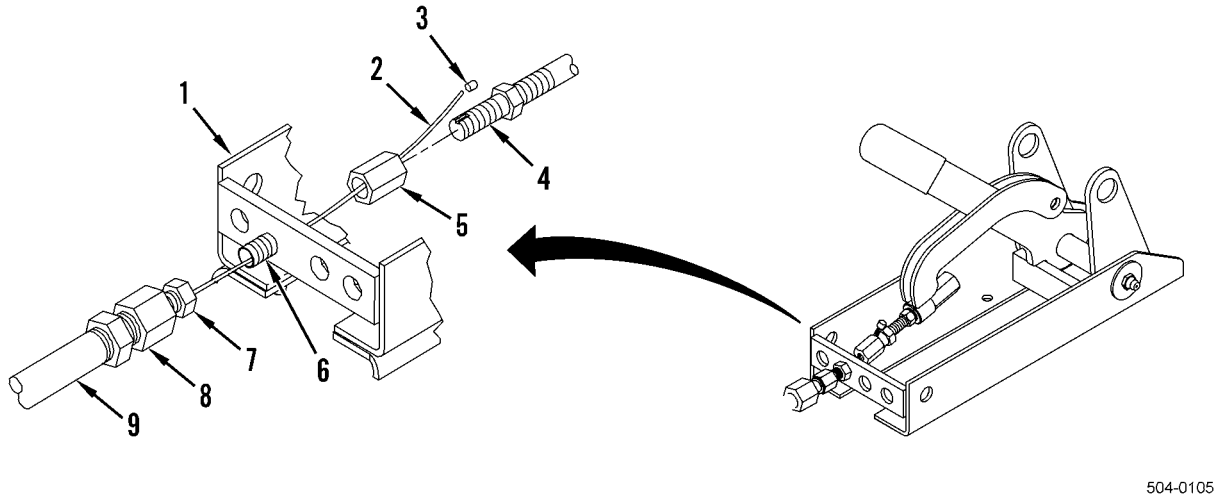


Figure 2. Control Cable and Guide.

11. Remove four locknuts (Figure 3, Item 5) and screws (Figure 3, Item 3) from TRM frame (Figure 3, Item 4) and TRM control lever mounting bracket (Figure 3, Item 2). Discard locknuts.
12. Remove the TRM control lever assembly (Figure 3, Item 1) and TRM control lever mounting bracket (Figure 3, Item 2) from TRM frame (Figure 3, Item 4) as an assembly.
13. Remove four locknuts (Figure 3, Item 6) and screws (Figure 3, Item 7) securing the TRM control lever assembly (Figure 3, Item 1) to TRM control lever mounting bracket (Figure 3, Item 2). Discard locknuts.
14. Remove TRM control lever assembly (Figure 3, Item 1) from TRM control lever mounting bracket (Figure 3, Item 2).
15. Remove nipples (Figure 3, Item 8) and nuts (Figure 3, Item 9) from TRM control lever assembly (Figure 3, Item 1) and save for re-attachment.

DISASSEMBLY – CONTINUED

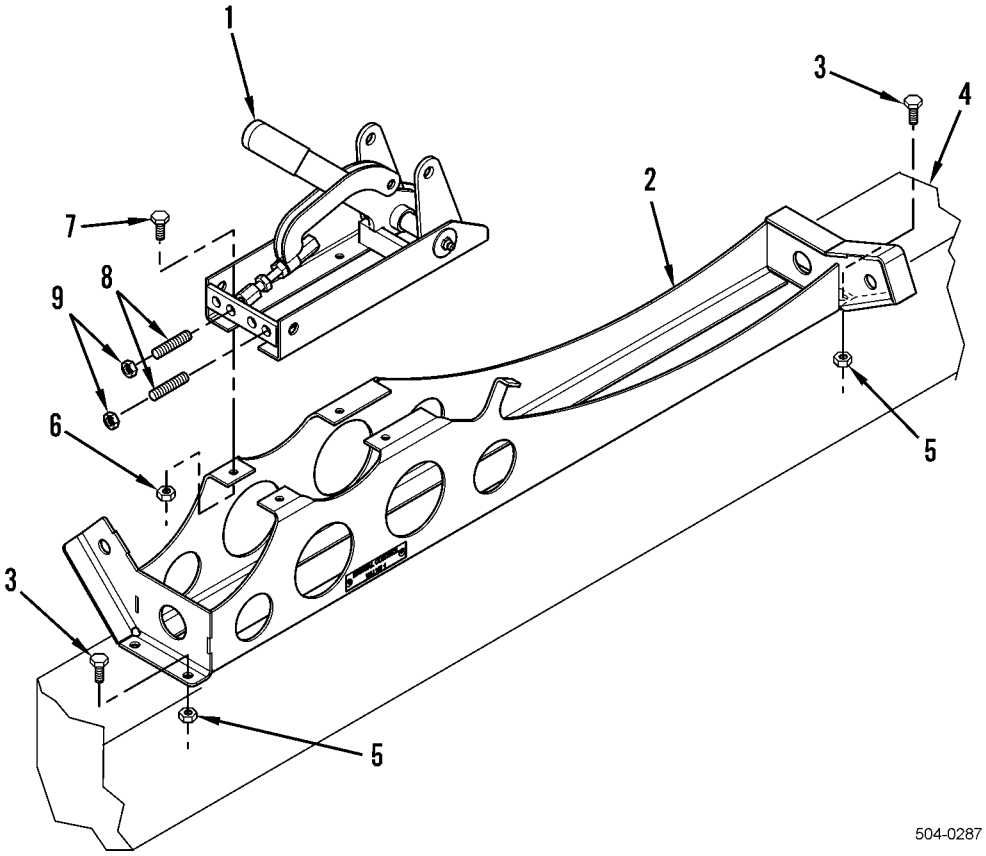


Figure 3. Control Lever Assembly and Mounting Bracket.

END OF TASK

ASSEMBLY

NOTE

- When installing cable guides, ensure at least 1 in. to 2 in. of cable extends beyond attachment point on either end to allow for possible adjustment.
- When cutting cables, tape ends to prevent fraying before installing stop sleeves.
- When installing stop sleeves, attach them at very ends of cable to allow for possible adjustment.

1. Install nipples (Figure 3, Item 8) and nuts (Figure 3, Item 9) to TRM control lever assembly (Figure 3, Item 1).
2. Install TRM control lever assembly (Figure 3, Item 1) to TRM control lever mounting bracket (Figure 3, Item 2) and secure with four screws (Figure 3, Item 7) and new locknuts (Figure 3, Item 6).
3. Install TRM control lever assembly (Figure 3, Item 1) and TRM control lever mounting bracket (Figure 3, Item 2) to TRM frame (Figure 3, Item 4) as an assembly and secure with four screws (Figure 3, Item 3) and new locknuts (Figure 3, Item 5).

ASSEMBLY – CONTINUED

4. Align cable guide (Figure 4, Item 9) with nipple (Figure 4, Item 6) of control lever body (Figure 4, Item 1).
5. Insert cable (Figure 4, Item 2) through nipple (Figure 4, Item 6). The end of cable must protrude past adjusting bolt (Figure 4, Item 4) far enough to install stop sleeve (Figure 4, Item 3).

NOTE

- If necessary, adjust jamnut on adjusting bolt to lengthen adjusting bolt.
- If necessary, check for slack in cable at V1 valve cable attachment.
- If adjustments cannot be made to allow for proper length of cable for reattachment, replace cable guide (WP 0092).

6. Install clamping nut (Figure 4, Item 5) on cable (Figure 4, Item 2).
7. Position cable (Figure 4, Item 2) in groove of adjusting bolt (Figure 4, Item 4).
8. Using wrench, hold nut (Figure 4, Item 7) and attach union (Figure 4, Item 8) to nipple (Figure 4, Item 6). Tighten union.
9. Install clamping nut (Figure 4, Item 5) on adjusting bolt (Figure 4, Item 4) to secure cable (Figure 4, Item 2). Tighten clamping nut.
10. Remove excess cable (Figure 4, Item 2).
11. Install new stop sleeve (Figure 4, Item 3) on end of cable (Figure 4, Item 2).

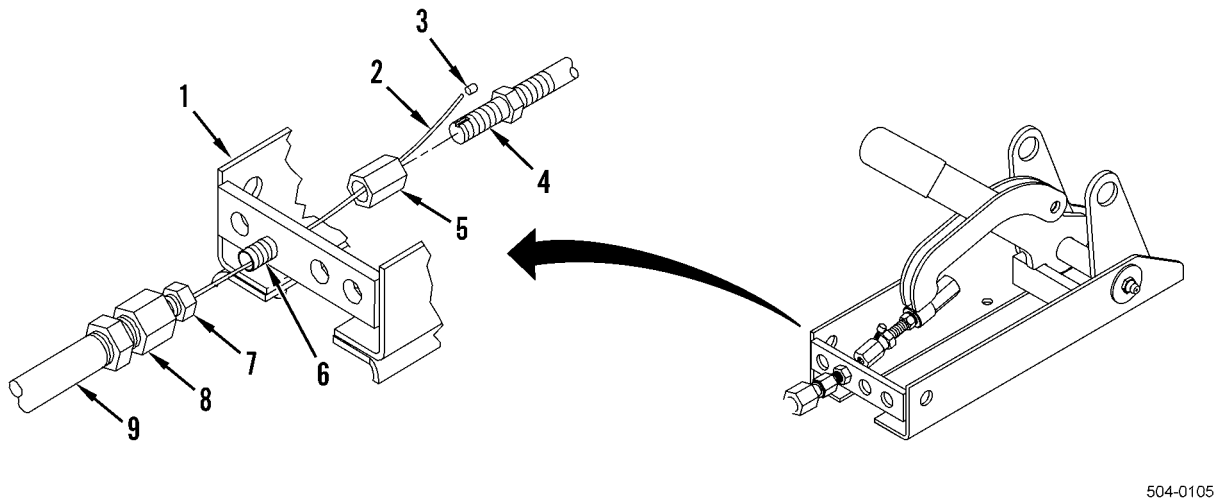


Figure 4. Control Cable and Guide.

ASSEMBLY – CONTINUED

12. Thread new cable (Figure 5, Item 2) through control lever assembly (Figure 5, Item 7) and trip cable clamp (Figure 5, Item 1). Loop end of cable (Figure 5, Item 2) back through trip cable clamp (Figure 5, Item 1) and protrude out far enough to install stop sleeve (Figure 5, Item 3).
13. Install new stop sleeve (Figure 5, Item 3) on cable (Figure 5, Item 2) and crimp.
14. Install cable clamp bushing (Figure 5, Item 4), new lockwasher (Figure 5, Item 5), and jamnut (Figure 5, Item 6) to trip cable clamp (Figure 5, Item 1).

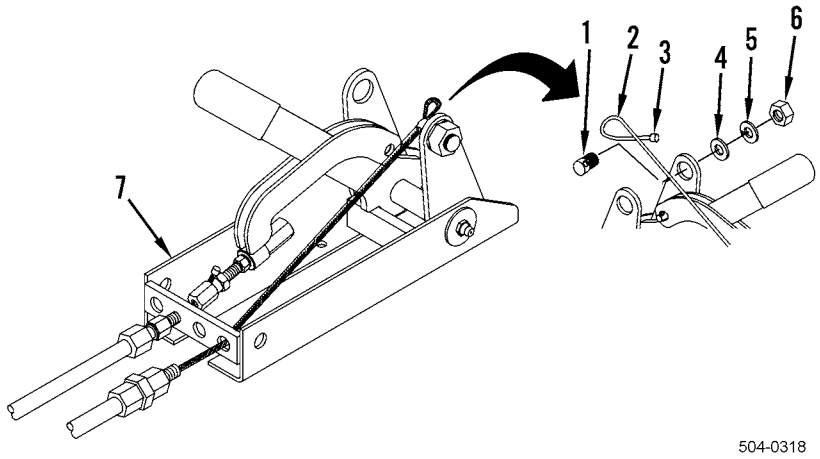


Figure 5. Control Cable and Guide.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

SIDE MECHANICAL OPERATOR CONTROL LEVER (V2) REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Splice compression tool (WP 0151, Item 4)

Materials/Parts

Nut, self-locking, hex (WP 0154, Item 16) (4)
Sleeve stop (WP 0154, Item 31)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

WP 0096
WP 0137

Equipment Condition

TRM shut down (WP 0022)
TRM drained (WP 0017)
TRM mounted on PLS trailer (WP 0013)
V2 valve cable guide removed (WP 0093)

REMOVAL

1. Remove V2 emergency stop cable guide (WP 0096-2, steps 5 - 10).
2. Remove four locknuts (Figure 1, Item 4) from screws (Figure 1, Item 1) securing control assembly (Figure 1, Item 2) to tank mounting bracket (Figure 1, Item 3). Discard locknuts.
3. Remove control lever assembly (Figure 1, Item 2).

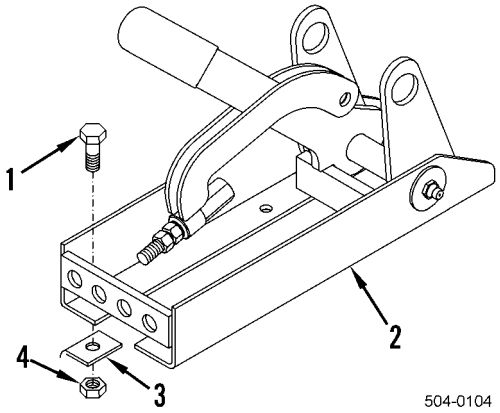


Figure 1. Control Lever Assembly.

END OF TASK

INSTALLATION

1. Position control lever assembly (Figure 1, Item 2).
2. Install four screws (Figure 1, Item 1) through control lever assembly (Figure 1, Item 2) and tank mounting brackets (Figure 1, Item 3).
3. Install four new locknuts (Figure 1, Item 4) on screws (Figure 1, Item 1) and tighten.
4. Install new V2 emergency stop cable guide (WP 0096-3, steps 1 - 9).
5. Install V2 valve cable guide (WP 0093).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

V1 VALVE CABLE GUIDE REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)
Splice compression tool (WP 0151, Item 4)

Materials/Parts

Strap, tiedown (WP 0153, Item 18) (A/R)
Sleeve stop (WP 0154, Item 31) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0138

Equipment Condition

TRM shut down (WP 0022)
TRM drained (WP 0017)
TRM mounted on PLS trailer (WP 0013)

REMOVAL

1. Remove clamping nut (Figure 1, Item 5) from adjusting bolt (Figure 1, Item 4).
2. Remove stop sleeve (Figure 1, Item 3) from cable (Figure 1, Item 2) and discard.
3. Remove clamping nut (Figure 1, Item 5) from cable (Figure 1, Item 2).
4. Using wrench, hold nut (Figure 1, Item 7) and remove union (Figure 1, Item 8) from nipple (Figure 1, Item 6).
5. Remove pipe-cable guide (Figure 1, Item 9) from control lever body (Figure 1, Item 1).

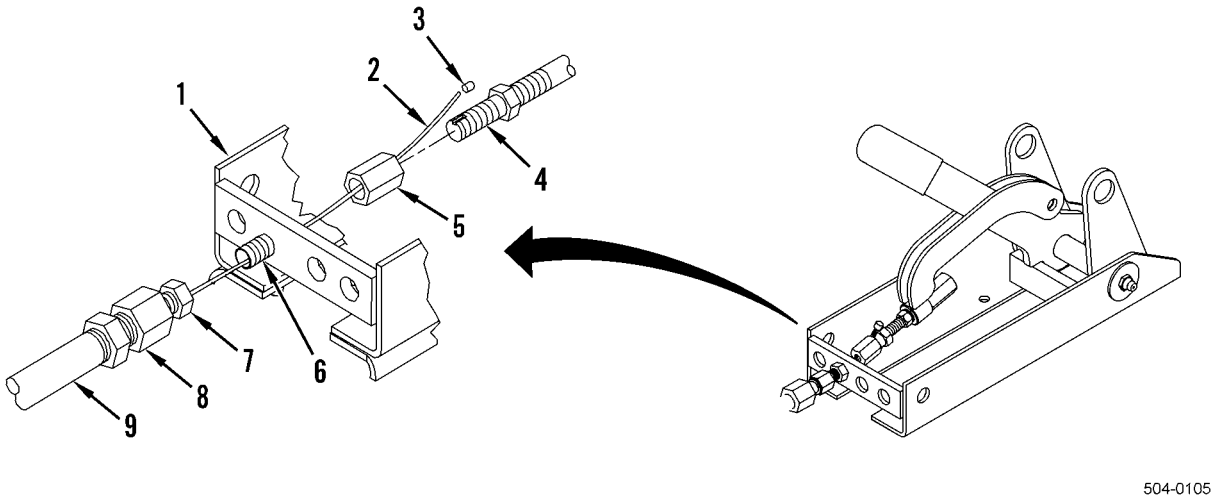


Figure 1. Control Lever Assembly.

REMOVAL – CONTINUED

6. Remove nut (Figure 2, Item 9) and clamp (Figure 2, Item 10) securing cable guide (Figure 2, Item 4) to TRM frame.

CAUTION

Use two wrenches to loosen pipe-cable guide. Failure to comply could result in damage to equipment.

7. Remove and discard tiedown straps as necessary to remove harness from cable guide.
8. Using wrench, hold reducer (Figure 2, Item 3) and remove threaded end of reducer (Figure 2, Item 2) from nipple (Figure 2, Item 1).
9. Remove pipe-cable guide (Figure 2, Item 4) from nipple (Figure 2, Item 1).
10. Loosen nut (Figure 2, Item 5) securing cable (Figure 2, Item 6) to fusible link (Figure 2, Item 8).
11. Remove stop sleeve (Figure 2, Item 7) from cable (Figure 2, Item 6) and discard.
12. Remove nut (Figure 2, Item 5) from cable (Figure 2, Item 2).
13. Remove cable guide (Figure 2, Item 4) from TRM.

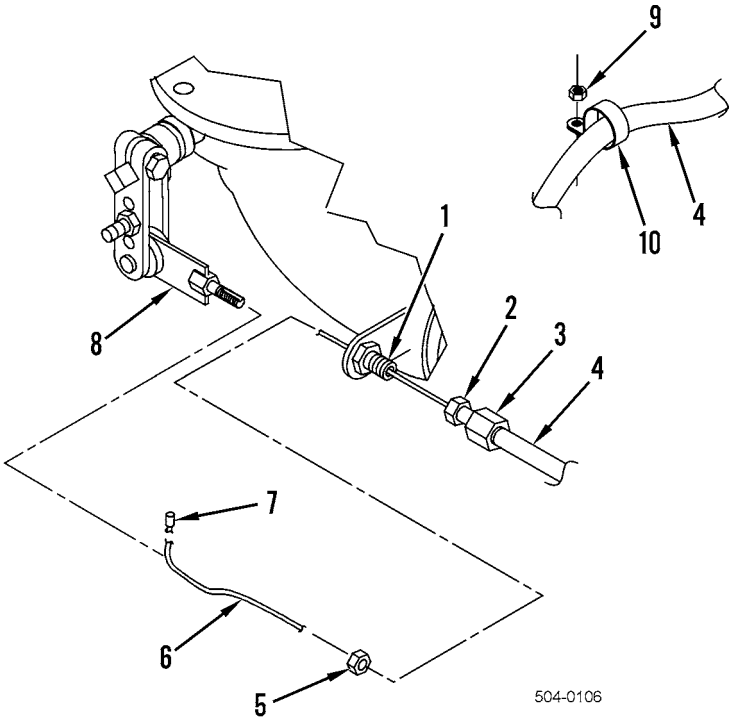


Figure 2. Fusible Link.

END OF TASK

INSTALLATION

NOTE

- Ensure V1 valve is closed.
- When installing cable guides, ensure at least 1 in. to 2 in. of cable extends beyond attachment point on either end to allow for possible adjustment.
- When cutting cables, tape ends to prevent fraying before installing stop sleeves.
- When installing stop sleeves, attach them at very ends of cable to allow for possible adjustment.

INSTALLATION – CONTINUED

1. Position cable guide (Figure 2, Item 4) on TRM.
2. Align one end of pipe-cable guide (Figure 2, Item 4) with nipple (Figure 2, Item 1).
3. Insert end of cable (Figure 2, Item 6) through nut (Figure 2, Item 5) and place in groove of threads in fusible link (Figure 2, Item 8).
4. Install threaded end of reducer (Figure 2, Item 2) on nipple (Figure 2, Item 1).
5. Install nut (Figure 2, Item 5) on fusible link (Figure 2, Item 8).
6. Install stop sleeve (Figure 2, Item 7) on cable (Figure 2, Item 6).
7. Align pipe-cable guide (Figure 3, Item 9) with nipple (Figure 3, Item 6) of control lever body (Figure 3, Item 1).
8. Insert cable (Figure 3, Item 2) through nipple (Figure 3, Item 6). The end of the cable (Figure 3, Item 2) must protrude past adjusting bolt (Figure 3, Item 4) far enough to install stop sleeve (Figure 3, Item 3).
9. Install clamping nut (Figure 3, Item 5) on cable (Figure 3, Item 2).
10. Install new stop sleeve (Figure 3, Item 3) on end of cable (Figure 3, Item 2).
11. Position cable (Figure 3, Item 2) in groove of adjusting bolt (Figure 3, Item 4).
12. Using wrench, hold nut (Figure 3, Item 7) and attach union (Figure 3, Item 8) to nipple (Figure 3, Item 6). Tighten union (Figure 3, Item 8).
13. Install clamping nut (Figure 3, Item 5) on adjusting bolt (Figure 3, Item 4) to secure cable (Figure 3, Item 2). Tighten clamping nut (Figure 3, Item 5).
14. Remove excess cable (Figure 3, Item 2).
15. Secure cable guide (Figure 2, Item 4) to TRM frame with clamp (Figure 2, Item 10) and nut (Figure 2, Item 9).
16. Install new tiedown straps as necessary.

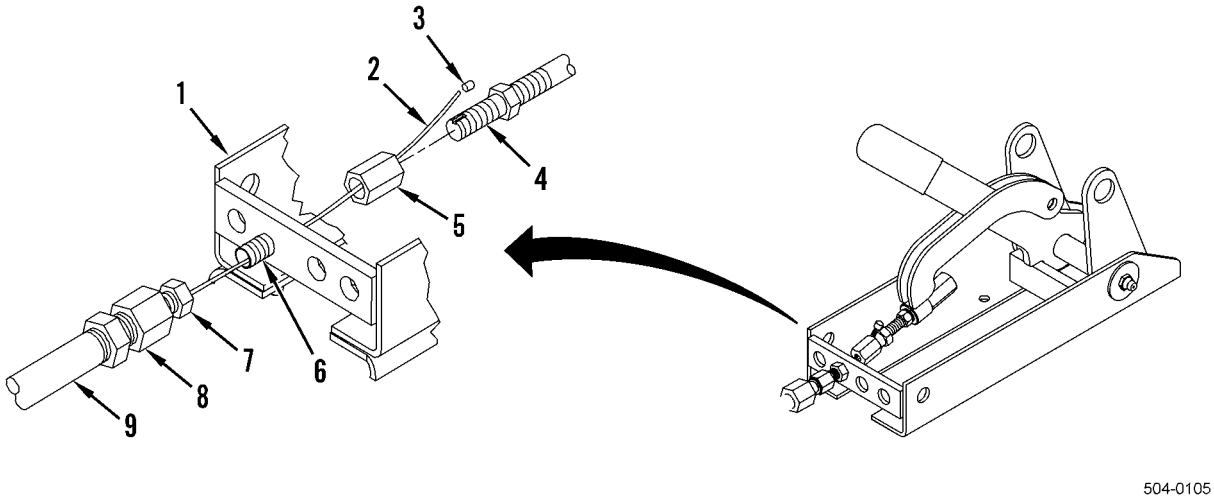


Figure 3. Control Lever Assembly.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

V2 VALVE CABLE GUIDE REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)
Splice compression tool (WP 0151, Item 4)

Materials/Parts

Sleeve stop (WP 0154, Item 31) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

WP 0137

Equipment Condition

TRM shut down (WP 0022)
TRM drained (WP 0017)
TRM mounted on PLS trailer (WP 0013)

REMOVAL

1. Remove clamping nut (Figure 1, Item 5) from adjusting bolt (Figure 1, Item 4).
2. Remove stop sleeve (Figure 1, Item 3) from cable (Figure 1, Item 2) and discard.
3. Remove clamping nut (Figure 1, Item 5) from cable (Figure 1, Item 2).
4. Using wrench, hold nut (Figure 1, Item 7) and remove union (Figure 1, Item 8) from nut (Figure 1, Item 7).
5. Remove cable guide (Figure 1, Item 9) away from control lever body (Figure 1, Item 1).
6. Remove nut (Figure 1, Item 7) and nipple (Figure 1, Item 6) from control lever body (Figure 1, Item 1).

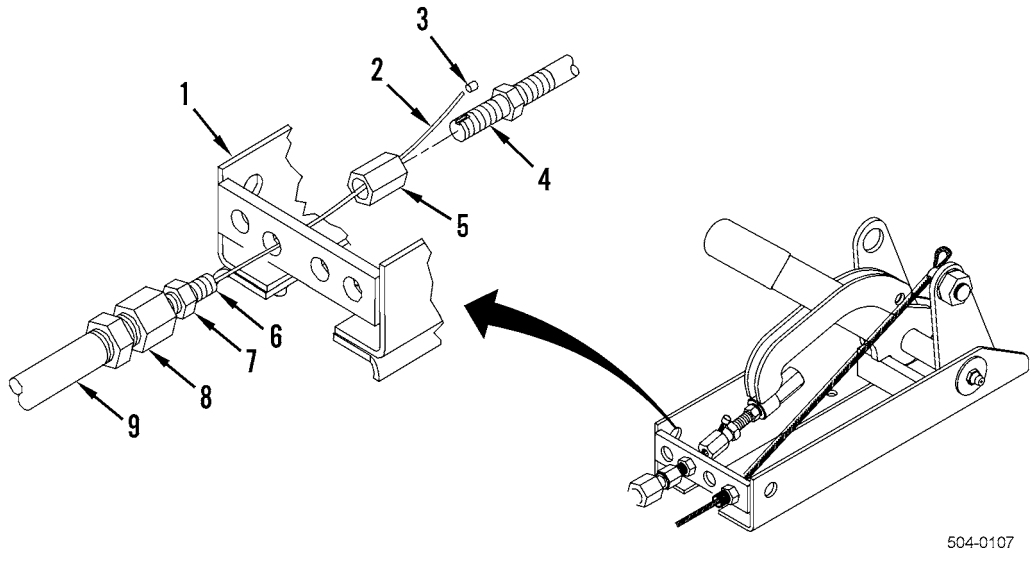


Figure 1. Control Lever Assembly.

REMOVAL – CONTINUED

7. Loosen nuts (Figure 2, Item 9) on clamp (Figure 2, Item 1) securing cable (Figure 2, Item 7) to valve handle (Figure 2, Item 2).
8. Remove stop sleeve (Figure 2, Item 8) from cable (Figure 2, Item 7) and discard.
9. Using wrench, hold reducer (Figure 2, Item 4) and remove threaded end of reducer (Figure 2, Item 3) from threaded bushing (Figure 2, Item 6).
10. Remove cable guide (Figure 2, Item 5) from threaded bushing (Figure 2, Item 6).

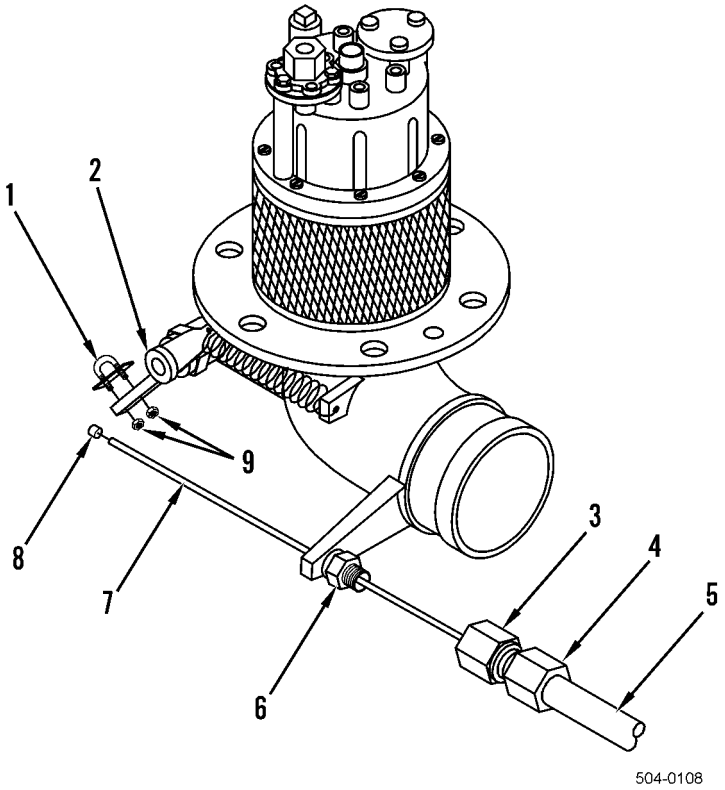


Figure 2. V2 Valve.

END OF TASK

INSTALLATION

NOTE

- When installing cable guides, ensure at least 1 in. to 2 in. of cable extends beyond attachment point on either end to allow for possible adjustment.
- When cutting cables, tape ends to prevent fraying before installing stop sleeves.
- When installing stop sleeves, attach them at very ends of cable to allow for possible adjustment.

1. Align cable guide (Figure 2, Item 5) with threaded bushing (Figure 2, Item 6).
2. Insert end of cable (Figure 2, Item 7) through threaded bushing (Figure 2, Item 6) and cable clamp (Figure 2, Item 1). Move end of cable (Figure 2, Item 7) past cable clamp (Figure 2, Item 1) far enough to install stop sleeve (Figure 2, Item 8).

INSTALLATION – CONTINUED

3. Using wrench, hold reducer (Figure 2, Item 4) and tighten threaded end of reducer (Figure 2, Item 3) to threaded bushing (Figure 2, Item 6).
4. Install new stop sleeve (Figure 2, Item 8) on cable (Figure 2, Item 7).
5. Tighten nuts (Figure 2, Item 9) securing cable (Figure 2, Item 7) to valve handle (Figure 2, Item 2).
6. Break union (Figure 3, Item 8) on cable guide (Figure 3, Item 9) and remove nipple (Figure 3, Item 6), nut (Figure 3, Item 7) and union (Figure 3, Item 8).
7. Install nipple (Figure 3, Item 6) and nut (Figure 3, Item 7) and union (Figure 3, Item 8) on control lever body (Figure 3, Item 1).
8. Insert cable (Figure 3, Item 2) through union (Figure 3, Item 8), nut (Figure 3, Item 7), and control lever body (Figure 3, Item 1) and attach union (Figure 3, Item 8) to nut (Figure 3, Item 7).
9. Install clamping nut (Figure 3, Item 5) on cable (Figure 3, Item 2).
10. Position cable (Figure 3, Item 2) in groove of adjusting bolt (Figure 3, Item 4).
11. Install clamping nut (Figure 3, Item 5) on adjusting bolt (Figure 3, Item 4) to secure cable (Figure 3, Item 2). Tighten clamping nut (Figure 3, Item 5).
12. Install new stop sleeve (Figure 3, Item 3) on end of cable (Figure 3, Item 2).
13. Open V2 valve to verify correct operation.

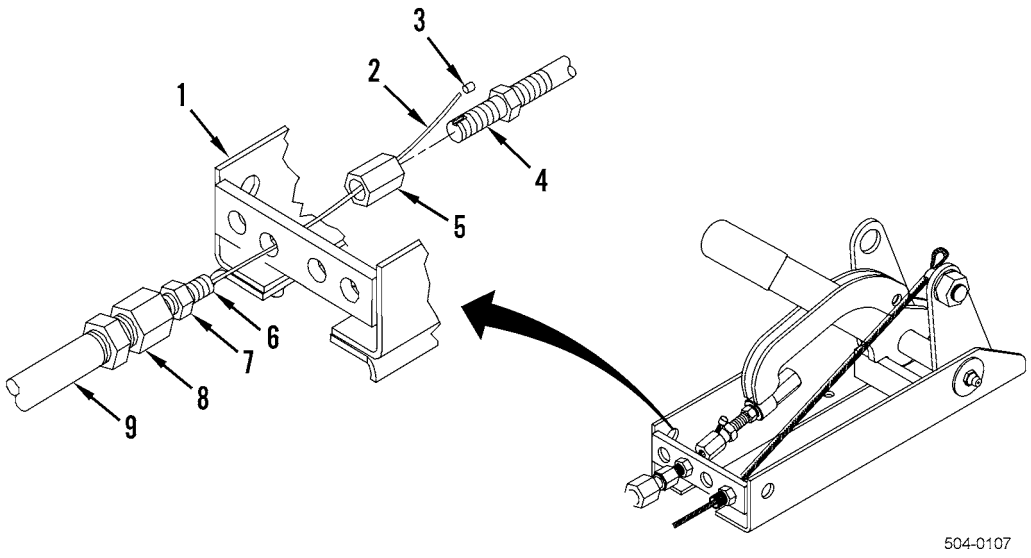


Figure 3. Control Lever Assembly.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

LEFT HAND EMERGENCY STOP CABLE GUIDE REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)
Splice compression tool (WP 0151, Item 4)

Materials/Parts

Nut, self-locking, hex (WP 0154, Item 16) (2)
Sleeve stop (WP 0154, Item 31) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0138

Equipment Condition

TRM shut down (WP 0022)
Battery box removed (WP 0057)

REMOVAL

1. Loosen four screws (Figure 1, Item 7) securing two-piece cable clamp (Figure 1, Item 1) to cable (Figure 1, Item 6).
2. Remove stop sleeve (Figure 1, Item 8) from cable (Figure 1, Item 6) and discard.
3. Using wrench, hold reducer (Figure 1, Item 3), unscrew threaded end of reducer (Figure 1, Item 4) from nipple (Figure 1, Item 5), and remove cable guide (Figure 1, Item 2).

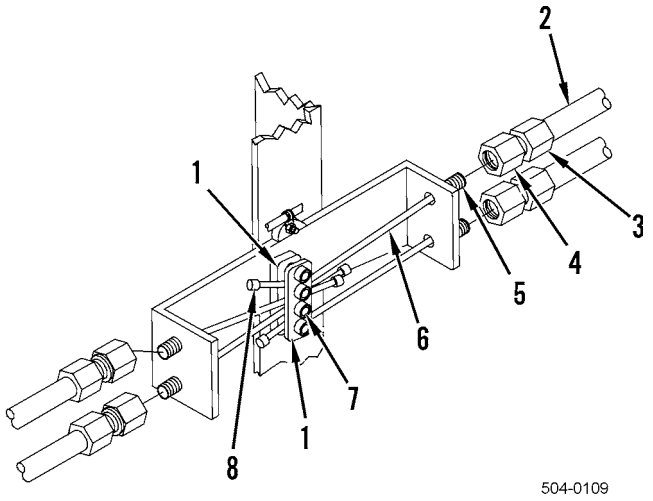


Figure 1. Emergency Cable Guide Connection.

REMOVAL – CONTINUED

4. Remove two locknuts (Figure 2, Item 1) and clamps (Figure 2, Item 2) securing cable guide (Figure 2, Item 3). Discard locknuts.

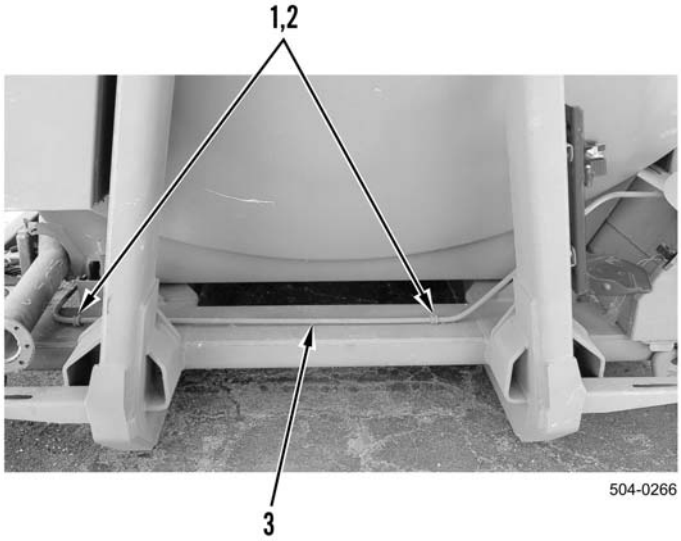


Figure 2. Cable Guide.

5. Loosen two nuts (Figure 3, Item 8) securing two-piece cable clamp (Figure 3, Item 3) and cable (Figure 3, Item 7) to emergency stop handle (Figure 3, Item 1).
6. Remove stop sleeve (Figure 3, Item 2) from cable (Figure 3, Item 7) and discard.
7. Using wrench, hold reducer (Figure 3, Item 6) and remove threaded end of reducer (Figure 3, Item 5) from nipple (Figure 3, Item 4).
8. Remove cable (Figure 3, Item 7) from nipple (Figure 3, Item 4).
9. Remove cable guide (Figure 2, Item 3) from TRM.

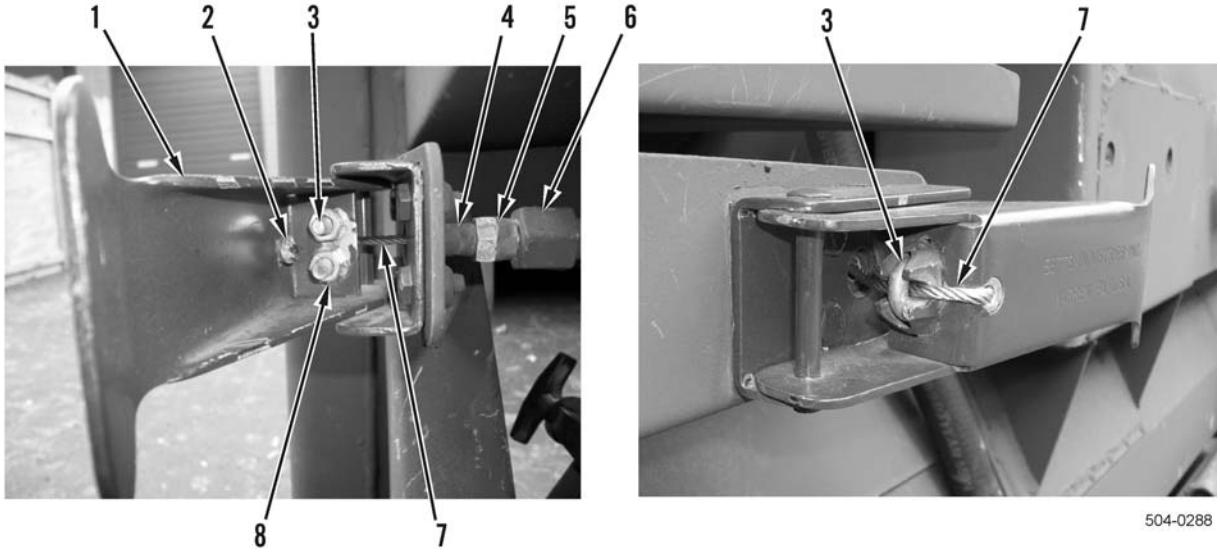


Figure 3. Emergency Stop.

END OF TASK

INSTALLATION

NOTE

- Ensure V1 valve is closed.
- When installing cable guides, ensure at least 1 in. to 2 in. of cable extends beyond attachment point on either end to allow for possible adjustment.
- When cutting cables, tape ends to prevent fraying before installing stop sleeves.
- When installing stop sleeves, attach them at very ends of cable to allow for possible adjustment.

1. Position cable guide (Figure 2, Item 3) on TRM.
2. Install end of new cable (Figure 4, Item 7) through nipple (Figure 4, Item 4). Move end of cable (Figure 4, Item 7) out hole in emergency stop handle (Figure 4, Item 8).
3. Install cable stop (Figure 4, Item 9) on cable (Figure 4, Item 7).
4. Install two-piece cable clamp (Figure 4, Item 3) on cable (Figure 4, Item 7). Position two-piece cable clamp (Figure 4, Item 3) on handle (Figure 4, Item 2).
5. Secure two-piece cable clamp (Figure 4, Item 3) to handle (Figure 4, Item 2) with two nuts (Figure 4, Item 1).
6. Install reducer (Figure 4, Item 5) on nipple (Figure 4, Item 4).
7. Using wrench, hold reducer (Figure 4, Item 6) and tighten reducer (Figure 4, Item 5) to nipple (Figure 4, Item 4).

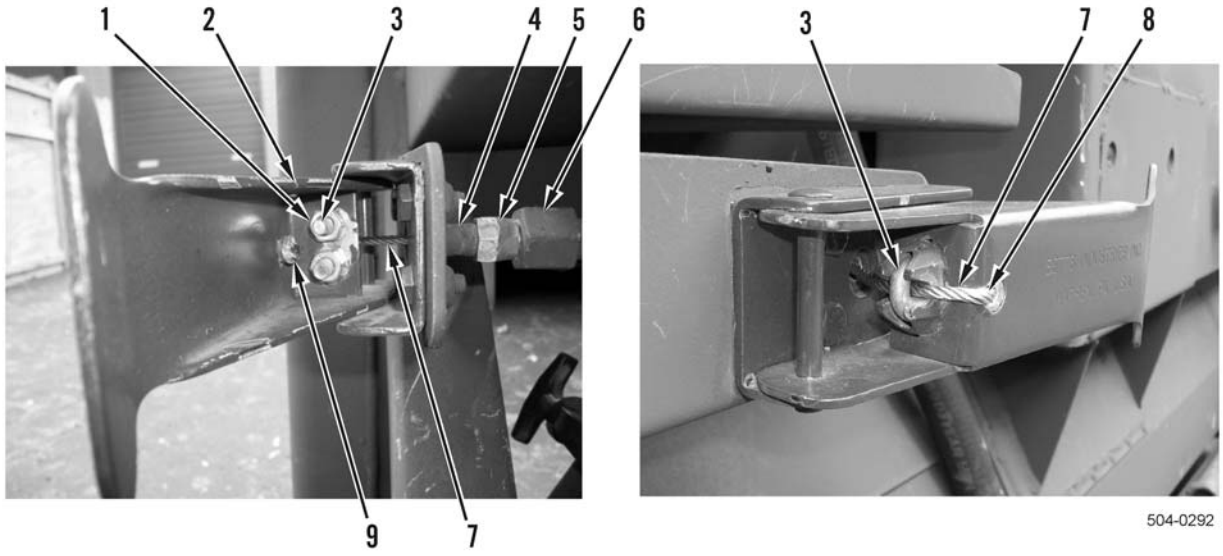


Figure 4. Emergency Stop.

INSTALLATION – CONTINUED

8. Thread cable (Figure 5, Item 6) through nipple (Figure 5, Item 5) and two-piece cable clamp (Figure 5, Item 1). Move end of new cable (Figure 5, Item 6) out of two-piece cable clamp (Figure 5, Item 1) far enough to install stop sleeve (Figure 5, Item 8).
9. Install cable guide (Figure 5, Item 2) on nipple (Figure 5, Item 5).
10. Using wrench, hold reducer (Figure 5, Item 3) and tighten threaded reducer end (Figure 5, Item 4).

NOTE

To adjust cables, open V1 and V2 valves.

11. Install new stop sleeve (Figure 5, Item 8) on new cable (Figure 5, Item 6).
12. Install two clamps (Figure 2, Item 2) and new locknuts (Figure 2, Item 1) securing cable guide (Figure 2, Item 3).
13. While holding two piece cable clamp (Figure 5, Item 1), position cable (Figure 5, Item 6) and tighten four screws (Figure 5, Item 7) on two-piece cable clamp (Figure 5, Item 1) securing cable (Figure 5, Item 6).

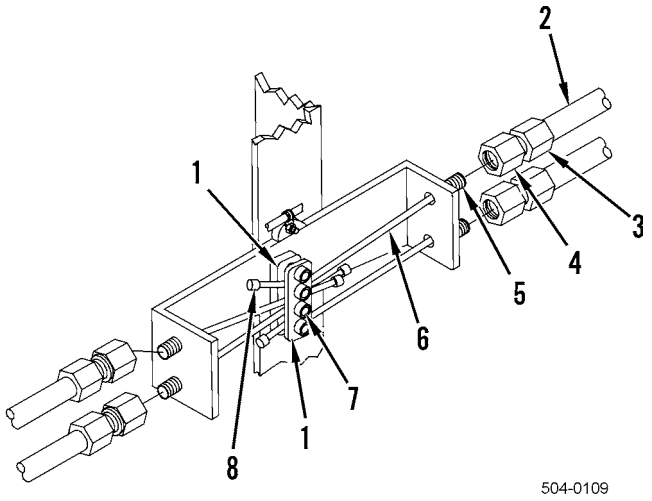


Figure 5. Emergency Cable Guide Connection.

14. Install battery box (WP 0057).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

RIGHT HAND EMERGENCY STOP CABLE GUIDE REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)
Splice compression tool (WP 0151, Item 4)

Materials/Parts

Sleeve stop (WP 0154, Item 31) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0138

Equipment Condition

TRM shut down (WP 0022)
Battery box removed (WP 0057)

REMOVAL

1. Loosen four screws (Figure 1, Item 7) securing two-piece cable clamp (Figure 1, Item 1) to cables (Figure 1, Item 6).
2. Remove stop sleeve (Figure 1, Item 8) from cable (Figure 1, Item 6) and discard.
3. Using wrench, hold reducer (Figure 1, Item 3), unscrew threaded end of reducer (Figure 1, Item 4) from nipple (Figure 1, Item 5), and remove cable guide (Figure 1, Item 2).

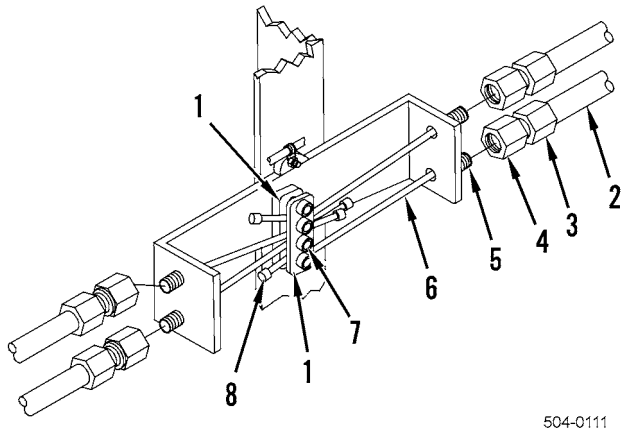


Figure 1. Emergency Stop Cable Guide Connection.

REMOVAL – CONTINUED

4. Loosen two nuts (Figure 2, Item 1) securing two-piece cable clamp (Figure 2, Item 3) and cable (Figure 2, Item 9) to remote control assembly handle (Figure 2, Item 2).
5. Remove stop sleeve (Figure 2, Item 4) from cable (Figure 2, Item 9) and discard.
6. Using wrench, hold reducer (Figure 2, Item 6) and remove threaded end of reducer (Figure 2, Item 7) from nipple (Figure 2, Item 8).
7. Remove cable (Figure 2, Item 9) from nipple (Figure 2, Item 8).
8. Remove cable guide (Figure 2, Item 5) from TRM.

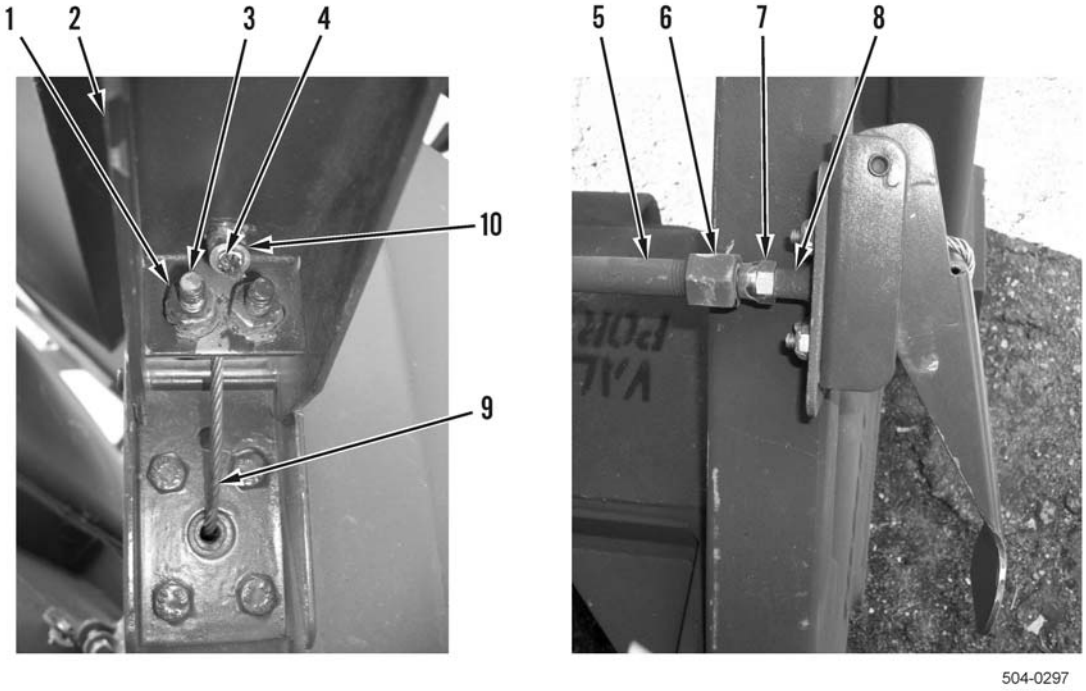


Figure 2. Emergency Stop.

END OF TASK

INSTALLATION

NOTE

- Ensure V1 valve is closed.
- When installing cable guides, ensure at least 1 in. to 2 in. of cable extends beyond attachment point on either end to allow for possible adjustment.
- When cutting cables, tape ends to prevent fraying before installing stop sleeves.
- When installing stop sleeves, attach them at very ends of cable to allow for possible adjustment.

1. Position cable guide (Figure 2, Item 5) on TRM.
2. Install end of new cable (Figure 2, Item 9) through nipple (Figure 2, Item 8). Move end of cable (Figure 2, Item 9) out hole in emergency stop handle (Figure 2, Item 10).
3. Install cable stop (Figure 2, Item 4) on cable (Figure 2, Item 9).

INSTALLATION – CONTINUED

4. Install two-piece cable clamp (Figure 2, Item 3) on cable (Figure 2, Item 9). Position two-piece cable clamp (Figure 2, Item 3) on handle (Figure 2, Item 2).
5. Secure two-piece cable clamp (Figure 2, Item 3) to handle (Figure 2, Item 2) with two nuts (Figure 2, Item 1).
6. Install reducer (Figure 2, Item 7) on nipple (Figure 2, Item 8).
7. Using wrench, hold reducer (Figure 2, Item 6) and tighten reducer (Figure 2, Item 7) to nipple (Figure 2, Item 8).
8. Thread new cable (Figure 3, Item 6) through nipple (Figure 3, Item 5) and two-piece cable clamp (Figure 3, Item 1). Move end of new cable (Figure 3, Item 6) out of two-piece cable clamp (Figure 3, Item 1) far enough to install stop sleeve (Figure 3, Item 8).
9. Install cable guide (Figure 3, Item 2) on nipple (Figure 3, Item 5).
10. Using wrench, hold reducer (Figure 3, Item 3) and tighten threaded reducer end (Figure 3, Item 4).

NOTE

To adjust cables, open V1 and V2 valves.

11. Install new stop sleeve (Figure 3, Item 8) on new cable (Figure 3, Item 6).
12. Position cable (Figure 3, Item 6) and tighten four screws (Figure 3, Item 7) on two-piece cable clamp (Figure 3, Item 1) securing cables (Figure 3, Item 6).

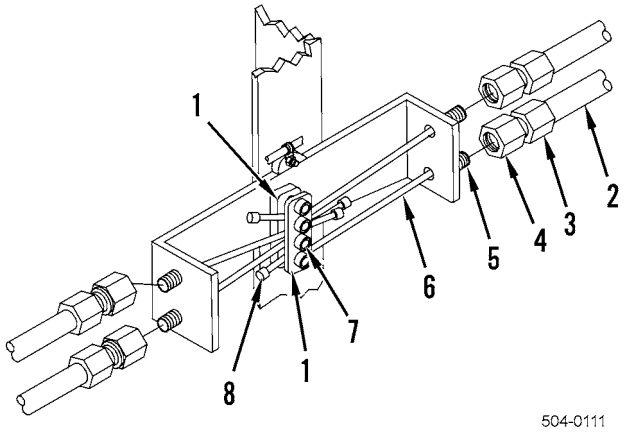


Figure 3. Emergency Stop Cable Guide Connection.

13. Install battery box (WP 0057).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

V1 AND V2 EMERGENCY STOP CABLE GUIDE REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)
Splice compression tool (WP 0151, Item 4)

Materials/Parts

Strap, tiedown (WP 0153, Item 18) (A/R)
Nut, self-locking, hex (WP 0154, Item 16) (4)
Sleeve stop (WP 0154, Item 31) (2)
Washer, lock (WP 0154, Item 37)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J (2)

References

WP 0138

Equipment Condition

TRM shut down (WP 0022)
TRM drained (WP 0017)
TRM mounted on PLS trailer (WP 0013)
Battery box removed (WP 0057)

REMOVAL

NOTE

- Removal and installation procedures apply to both the V1 and V2.
- V1 cable guide has four locknuts and clamps; V2 cable guide has two locknuts and clamps.
- It may be necessary to remove coupling on bottom load valve piping to access locknut and clamp.

1. Remove locknuts (Figure 1, Item 1) and clamps (Figure 1, Item 2) from cable guide (Figure 1, Item 3). Discard locknuts.
2. Remove tiedown straps (Figure 1, Item 4) as necessary and discard.

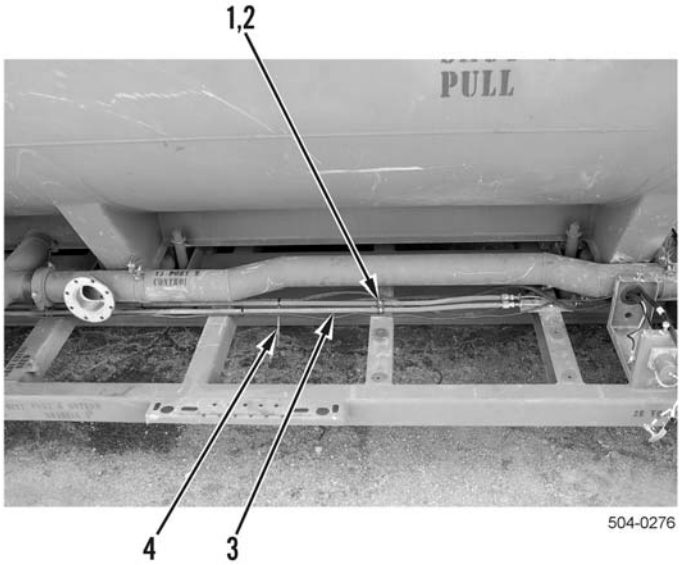


Figure 1. Cable Guides.

REMOVAL – CONTINUED

3. Loosen four screws (Figure 2, Item 3) securing two-piece cable clamp (Figure 2, Item 4) to cable (Figure 2, Item 5).
4. Remove stop sleeve (Figure 2, Item 2) from cable (Figure 2, Item 5) and discard.
5. Using wrench, hold reducer (Figure 2, Item 7), unscrew threaded end of reducer (Figure 2, Item 8) from nipple (Figure 2, Item 1), and disconnect cable guide (Figure 2, Item 6).

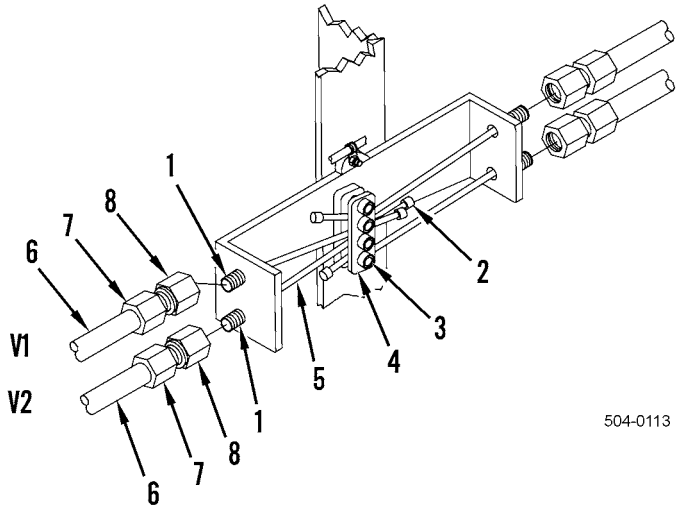


Figure 2. Emergency Stop Cable Guide Connection.

6. Remove jamnut (Figure 3, Item 7), lockwasher (Figure 3, Item 6) and cable clamp bushing (Figure 3, Item 5) from trip cable clamp (Figure 3, Item 1) on control lever (Figure 3, Item 4). Discard lockwasher.
7. Remove stop sleeve (Figure 3, Item 3) from cable (Figure 3, Item 2) and discard.
8. Remove cable (Figure 3, Item 2) from trip cable clamp (Figure 3, Item 1).
9. Using wrench, hold nut (Figure 3, Item 9) and remove union (Figure 3, Item 10) from nipple (Figure 3, Item 8) from control lever assembly (Figure 3, Item 12).
10. Remove one end of cable guide (Figure 3, Item 11) and other end of cable guide (Figure 3, Item 11).

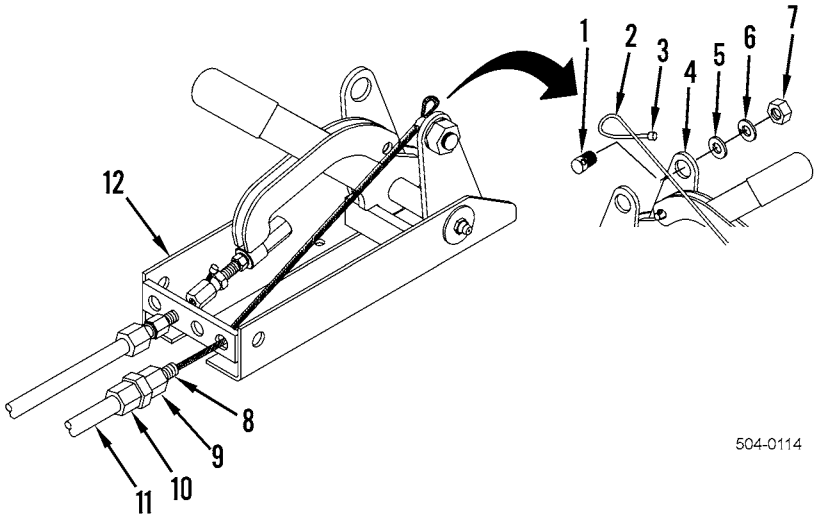


Figure 3. Control Lever Assembly.

END OF TASK

INSTALLATION

NOTE

- Ensure V1 valve is closed.
- When installing cable guides, ensure at least 1 in. to 2 in. of cable extends beyond attachment point on either end to allow for possible adjustment.
- When cutting cables, tape ends to prevent fraying before installing stop sleeves.
- When installing stop sleeves, attach them at very ends of cable to allow for possible adjustment.

1. Position both ends of cable guide (Figure 2, Item 6 and Figure 3, Item 11) on TRM frame.
2. Thread new cable (Figure 3, Item 2) through nipple (Figure 3, Item 1) and two-piece cable clamp (Figure 3, Item 4). The end of cable (Figure 3, Item 2) must protrude out of two-piece cable clamp (Figure 3, Item 4) far enough to install stop sleeve (Figure 3, Item 3).
3. Break union (Figure 3, Item 10) on cable guide (Figure 3, Item 11) and remove nipple (Figure 3, Item 8) and nut (Figure 3, Item 9).
4. Install nipple (Figure 3, Item 8) and nut (Figure 3, Item 9) on control lever assembly (Figure 3, Item 12).
5. Thread new cable (Figure 3, Item 2) through control lever assembly (Figure 3, Item 12) and trip cable clamp (Figure 3, Item 1). Loop end of cable (Figure 3, Item 2) back through trip cable clamp (Figure 3, Item 1) and protrude out far enough to install stop sleeve (Figure 3, Item 3).
6. Install new stop sleeve (Figure 3, Item 3) on cable (Figure 3, Item 2) and crimp.
7. Install cable clamp bushing (Figure 3, Item 5), new lockwasher (Figure 3, Item 6), and tighten jamnut (Figure 3, Item 7) to trip cable clamp (Figure 3, Item 1).
8. Install cable (Figure 2, Item 6) on nipple (Figure 2, Item 1).
9. Using wrench, hold reducer (Figure 2, Item 7) and tighten threaded end of reducer (Figure 2, Item 8).
10. Open V1 and V2 valves.
11. Install new stop sleeve (Figure 2, Item 2) on new cable (Figure 2, Item 5).
12. Adjust cable (Figure 2, Item 5) and tighten four screws (Figure 2, Item 3) on two-piece cable clamp (Figure 2, Item 4) securing cable (Figure 2, Item 5).

INSTALLATION – CONTINUED

13. Install clamps (Figure 4, Item 2) and new locknuts (Figure 4, Item 1) on cable guide (Figure 4, Item 3).

NOTE

If removed, install coupling on bottom load valve piping.

14. Install new tiedown straps (Figure 4, Item 4) as necessary.

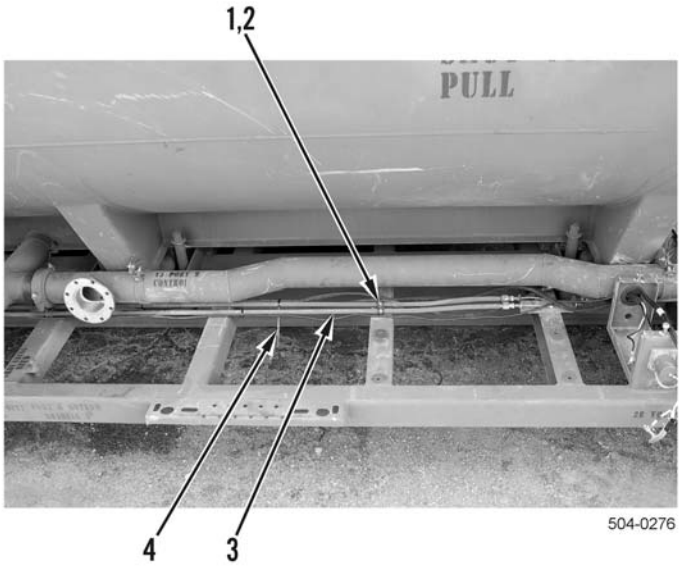


Figure 4. Cable Guides.

15. Replace battery box (WP 0057).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

DISCHARGE HOSE REPAIR
Disassembly, Clean, Assembly

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Single diameter hand tool (WP 0151, Item 3)

Materials/Parts

Cleaning compound, solvent (WP 0153, Item 2)
Cloth, cleaning (WP 0153, Item 5)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Rope, wire (WP 0154, Item 29)
Seal, plain (WP 0154, Item 30) (2)

Materials/Parts - Continued

Sleeve, swagging, wire rope (WP 0154, Item 32) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0139

Equipment Condition

TRM shut down (WP 0022)

NOTE

This work package covers all sizes of discharge hoses.

DISASSEMBLY

1. Twist dust cap (Figure 1, Item 8) counterclockwise to remove it from coupling assembly (Figure 1, Item 4).
2. Remove dust cap (Figure 1, Item 8) and dust cap seal (Figure 1, Item 7).
   a. Cut and remove cable (Figure 1, Item 1) from dust cap (Figure 1, Item 8).
   b. Remove split ring (Figure 1, Item 3) and cable (Figure 1, Item 1) from coupling assembly (Figure 1, Item 4).
   c. Remove dust cap seal (Figure 1, Item 7) from dust cap (Figure 1, Item 8) and discard.
3. Remove bumper (Figure 1, Item 6) from coupling assembly (Figure 1, Item 4) interface.
4. Remove coupling seal (Figure 1, Item 5) from coupling assembly (Figure 1, Item 4) interface.

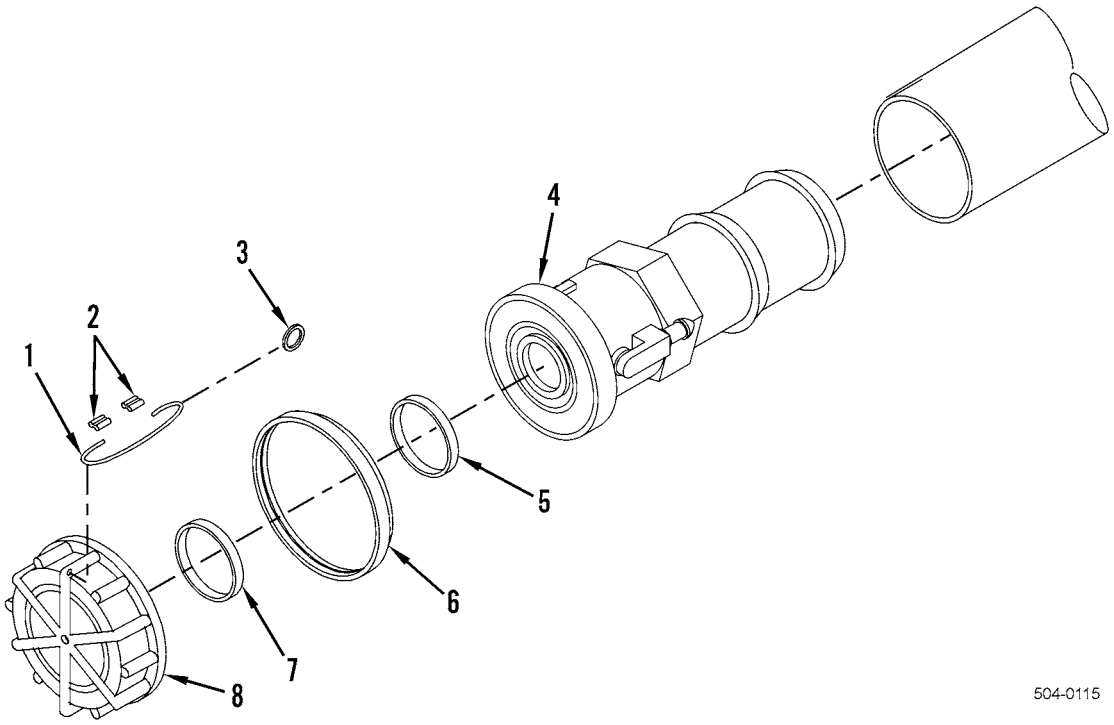
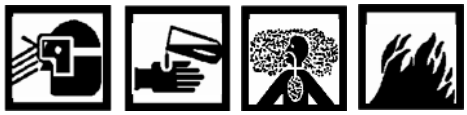


Figure 1. Discharge Hose.

END OF TASK

CLEAN

WARNING



Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition. Failure to comply may cause injury or death to personnel.

1. Clean all metallic parts with a cleaning cloth and solvent cleaning compound.
2. Allow parts to thoroughly dry.

END OF TASK

ASSEMBLY

1. Install new coupling seal (Figure 1, Item 5) in groove of coupling (Figure 1, Item 4) interface.
2. Install bumper (Figure 1, Item 6) on coupling assembly Figure 1, Item 2) interface with thin lip seal end facing away from coupling assembly (Figure 1, Item 4).
3. Install dust cap (Figure 1, Item 8) and dust cap seal (Figure 1, Item 7).
   a. Loop one end of new 18 in. (45.72 cm) cable (Figure 1, Item 1) through new sleeve (Figure 1, Item 2), dust cap (Figure 1, Item 8), and back through sleeve (Figure 1, Item 2).
   b. Crimp sleeve (Figure 1, Item 2).
   c. Loop other end of 18 in. (45.72 cm) cable (Figure 1, Item 1) through sleeve (Figure 1, Item 2), split ring (Figure 1, Item 3), and back through sleeve (Figure 1, Item 2).
   d. Install split ring (Figure 1, Item 3) on coupling assembly (Figure 1, Item 4).
   e. Crimp sleeve (Figure 1, Item 2).
   f. Install new seal (Figure 1, Item 7) on dust cap (Figure 1, Item 8).
   g. Twist dust cap (Figure 1, Item 8) clockwise until it locks on coupling assembly (Figure 1, Item 4).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

SUCTION HOSE REPAIR
Disassembly, Clean, Assembly

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Cleaning compound, solvent (WP 0153, Item 2)
Cloth, cleaning (WP 0153, Item 5)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Pan, drip, 6.5 gal. capacity (WP 0153, Item 14)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0140

Equipment Condition

TRM shut down (WP 0022)

DISASSEMBLY

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Place drip pan under male and female camlock connectors (Figure 1, Items 2 and 14).
2. Pull out camlock levers (Figure 1, Item 5).
3. Remove dust cap (Figure 1, Item 4) from male camlock connector coupling half (Figure 1, Item 2).
4. Pull out camlock levers (Figure 1, Item 1).
5. Remove dust plug (Figure 1, Item 12) from female camlock connector coupling half (Figure 1, Item 14).
6. Remove gaskets (Figure 1, Items 3 and 13) from female camlock connector coupling half (Figure 1, Item 14) and dust cap (Figure 1, Item 4).
7. Remove split ring (Figure 1, Item 6) from dust cap (Figure 1, Item 4).
8. Remove split ring (Figure 1, Item 6) from chain (Figure 1, Item 7).
9. Remove split ring (Figure 1, Item 8) from male camlock connector coupling half (Figure 1, Item 2).
10. Remove split ring (Figure 1, Item 8) from chain (Figure 1, Item 7).
11. Remove split ring (Figure 1, Item 9) from female camlock connector coupling half (Figure 1, Item 14).
12. Remove split ring (Figure 1, Item 9) from chain (Figure 1, Item 10).
13. Remove spit ring (Figure 1, Item 11) from dust plug (Figure 1, Item 12).
14. Remove split ring (Figure 1, Item 11) from chain (Figure 1, Item 10).

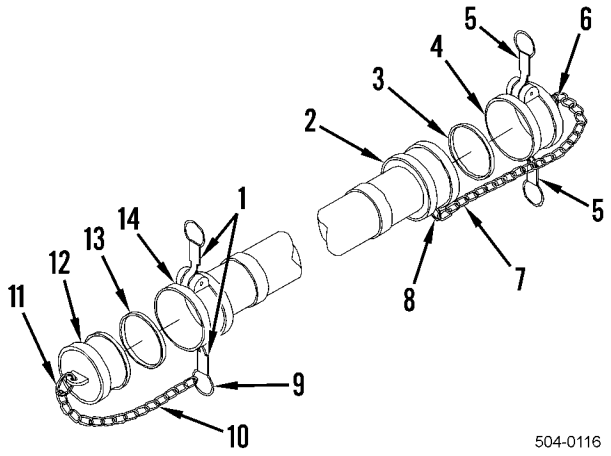
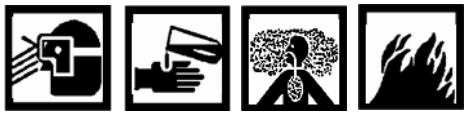


Figure 1. Suction Hose.

END OF TASK

CLEAN

WARNING



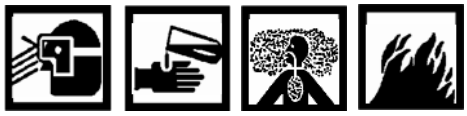
Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition. Failure to comply may cause injury or death to personnel.

1. Place drip pan under male and female camlock connectors.
2. Use solvent cleaning compound and cleaning cloth to remove debris from components.
3. Allow components to air dry.

END OF TASK

ASSEMBLY

WARNING



Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Install split ring (Figure 1, Item 11) on chain (Figure 1, Item 10).
2. Install split ring (Figure 1, Item 11) on dust plug (Figure 1, Item 12).
3. Install split ring (Figure 1, Item 9) on chain (Figure 1, Item 10).
4. Install split ring (Figure 1, Item 9) on female camlock connector coupling half (Figure 1, Item 14).
5. Install split ring (Figure 1, Item 8) on chain (Figure 1, Item 7).
6. Install split ring (Figure 1, Item 8) on male camlock connector coupling half (Figure 1, Item 2).
7. Install split ring (Figure 1, Item 6) on chain (Figure 1, Item 7)
8. Install split ring (Figure 1, Item 6) on dust cap (Figure 1, Item 4).
9. Install gaskets (Figure 1, Item 3 and 13) in dust cap (Figure 1, Item 4) and female camlock connector coupling half (Figure 1, Item 14).
10. Install dust cap (Figure 1, Item 4) on male camlock connector coupling half (Figure 1, Item 2).
11. Push in camlock levers (Figure 1, Item 5).
12. Install dust plug (Figure 1, Item 12) in female camlock connector coupling half (Figure 1, Item 14).
13. Push in camlock levers (Figure 1, Item 1).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

NOZZLE ASSEMBLY WITH VALVED DRY BREAK COUPLING REPAIR
Disassembly, Clean, Assembly

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)
Single diameter hand tool (WP 0151, Item 3)

Materials/Parts

Cleaning compound, solvent (WP 0153, Item 2)
Cloth, cleaning (WP 0153, Item 5)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Sealing compound (WP 0153, Item 17)
Rope, wire (WP 0154, Item 29)

Materials/Parts - Continued

Seal, plain (WP 0154, Item 30) (2)
Sleeve, swagging, wire rope (WP 0154, Item 32) (2)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0141

Equipment Condition

TRM shut down (WP 0022)

DISASSEMBLY

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Unscrew nozzle assembly (Figure 1, Item 1) from coupling assembly (Figure 1, Item 2).
2. Remove screw (Figure 1, Item 4) and grounding clamp (Figure 1, Item 3).

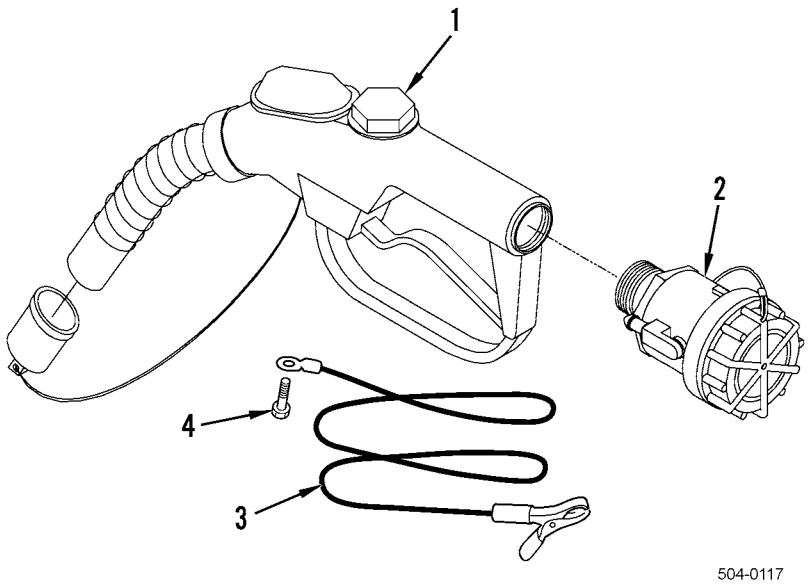


Figure 1. Nozzle Assembly and Valved Dry Break Coupling Assembly.

3. Twist dust cap (Figure 2, Item 8) counterclockwise to remove it from coupling assembly (Figure 2, Item 4).
4. Remove the dust cap (Figure 2, Item 8) or dust cap seal (Figure 2, Item 7).
   a. Cut and remove cable (Figure 2, Item 1) from coupling assembly (Figure 2, Item 4).
   b. Remove ring (Figure 2, Item 3) and cable (Figure 2, Item 1) from coupling assembly (Figure 2, Item 4).
   c. Remove dust cap seal (Figure 2, Item 7) from dust cap (Figure 2, Item 8) and discard.

DISASSEMBLY – CONTINUED

5. Remove bumper (Figure 2, Item 6) from coupling assembly (Figure 2, Item 4) interface.
6. Remove coupling seal (Figure 2, Item 5) from coupling assembly (Figure 2, Item 4) interface.

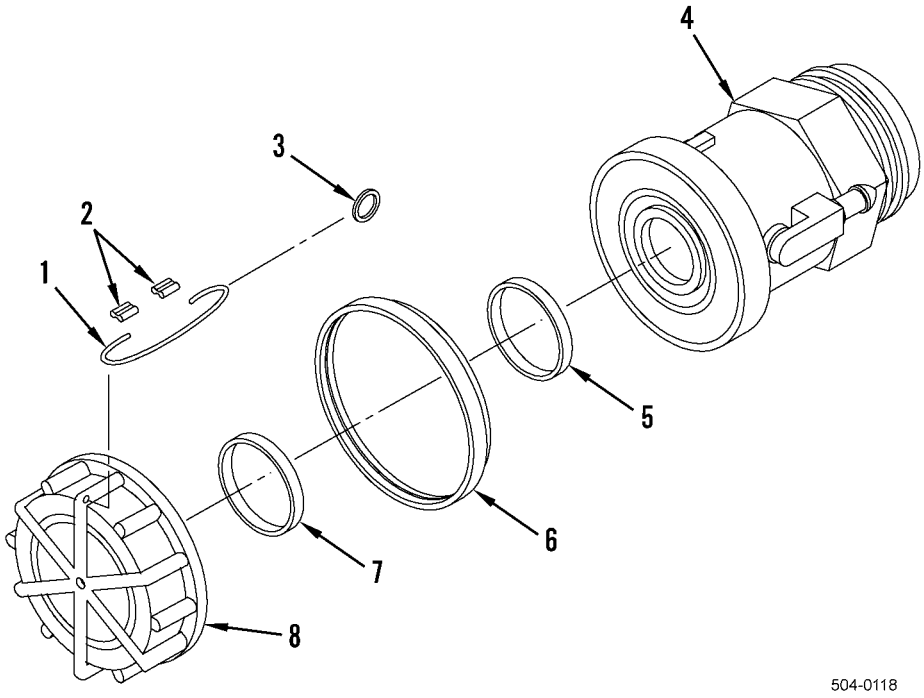


Figure 2. Valved Dry Break Coupling Assembly.

END OF TASK

CLEAN

WARNING

Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition. Failure to comply may cause injury or death to personnel.

1. Clean all metallic parts with a cleaning cloth and solvent cleaning compound.
2. Allow parts to dry thoroughly.

END OF TASK

ASSEMBLY

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Install new coupling seal (Figure 3, Item 5) in groove of coupling (Figure 3, Item 4) interface.
2. Install bumper (Figure 3, Item 6) on coupling assembly Figure 3, Item 4) interface with thin lip seal end facing away from coupling assembly (Figure 3, Item 4).
3. Install dust cap (Figure 3, Item 8) and dust cap seal (Figure 3, Item 7).
   a. Loop one end of new 18 in. (45.72 cm) cable (Figure 3, Item 1) through new sleeve (Figure 3, Item 2), dust cap (Figure 3, Item 8) and back through sleeve (Figure 3, Item 2).
   b. Crimp sleeve (Figure 3, Item 2).
   c. Loop other end of 18 in. (45.72 cm) cable (Figure 3, Item 1) through sleeve (Figure 3, Item 2), split ring (Figure 3, Item 3) and back through sleeve (Figure 3, Item 2).
   d. Crimp sleeve (Figure 3, Item 2).
   e. Install new seal (Figure 3, Item 7) on new dust cap (Figure 3, Item 8).
4. Twist dust cap (Figure 3, Item 8) clockwise to until it locks on coupling assembly (Figure 3, Item 4).

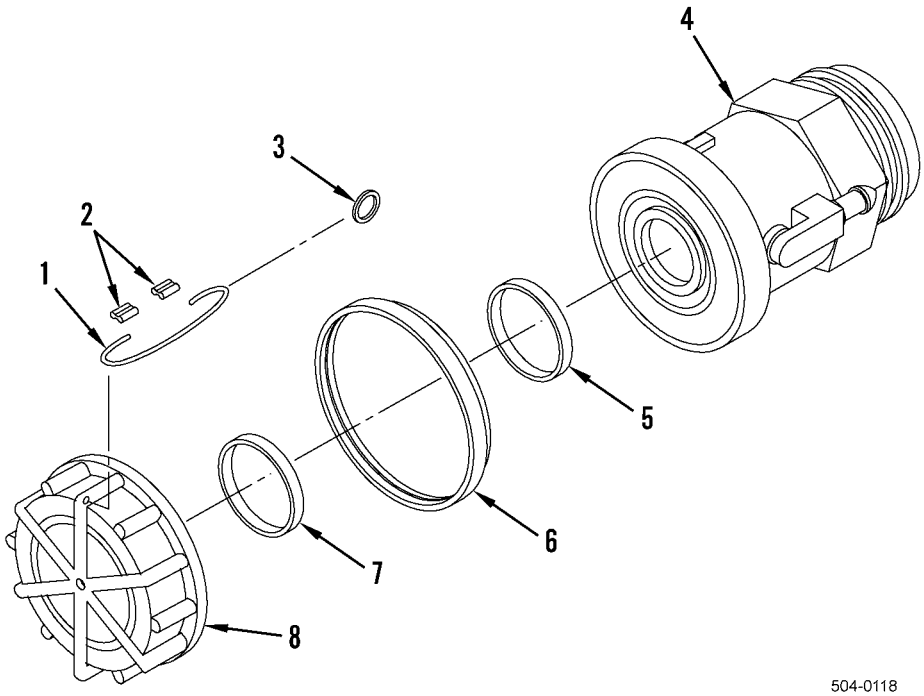


Figure 3. Valved Dry Break Coupling Assembly.

ASSEMBLY – CONTINUED

WARNING

Goggles and gloves must be worn when working with sealing compound. Avoid contact with eyes and skin. Avoid breathing vapors and ensure there is adequate ventilation. If sealing compound contacts eyes, flush eyes with cold water for at least 15 minutes and seek immediate medical attention. If sealing compound contacts skin, wash skin thoroughly with soap and water. Failure to comply could result in injury to personnel.

5. Install grounding clamp (Figure 4, Item 3) and screw (Figure 4, Item 4).
6. Install nozzle assembly (Figure 4, Item 1) on coupling assembly (Figure 4, Item 2).
   a. Apply sealing compound to threads of coupling (Figure 4, Item 2).
   b. Install and tighten nozzle assembly (Figure 4, Item 1) on coupling assembly (Figure 4, Item 2).

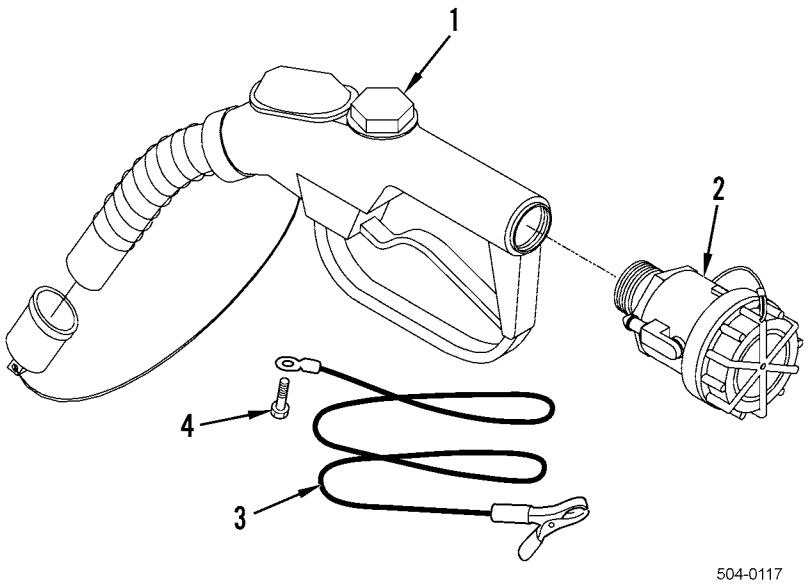


Figure 4. Nozzle Assembly and Valved Dry Break Coupling Assembly.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

CAMLOCK ADAPTER REPAIR
Disassembly, Clean, Assembly

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Wrench, torque, 0-175 lb-ft (WP 0151, Item 7)
Knife, putty (WP 0152, Table 2, Item 3)

Materials/Parts

Cleaning compound, solvent (WP 0153, Item 2)
Cloth, cleaning (WP 0153, Item 5)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
Gasket-4, flange (WP 0154, Item 5) (4)

Materials/Parts - Continued

Washer, lock (WP 0154, Item 36) (8)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0142

Equipment Condition

TRM shut down (WP 0022)

DISASSEMBLY

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Remove quick disconnect dust cap (Figure 1, Item 24) and gasket (Figure 1, Item 23) from coupling (Figure 1, Item 22).
2. Remove quick disconnect dust plug (Figure 1, Item 16) and gasket (Figure 1, Item 17) from coupling (Figure 1, Item 10).
3. Remove 8 nuts (Figure 1, Item 13), lockwashers (Figure 1, Item 12), 16 washers (Figure 1, Items 11 and 4), and 8 screws (Figure 1, Item 3) from coupling (Figure 1, Item 22) connecting the butterfly valve (Figure 1, Item 6) to the coupling (Figure 1, Item 10). Discard lockwashers.
4. Remove four gaskets (Figure 1, Items 7, 9, 19, and 21), two flange pipes (Figure 1, Items 8 and 20), coupling (Figure 1, Item 22), and butterfly valve (Figure 1, Item 6). Discard gaskets.
5. Remove split rings (Figure 1, Items 1 and 5) from quick disconnect dust cap (Figure 1, Item 24) and coupling (Figure 1, Item 22).
6. Remove split rings (Figure 1, Items 1 and 5) from chain (Figure 1, Item 2).
7. Remove split rings (Figure 1, Items 15 and 18) from coupling (Figure 1, Item 10) and quick disconnect dust plug (Figure 1, Item 16).
8. Remove split rings (Figure 1, Items 15 and 18) from chain (Figure 1, Item 14).
9. Remove nut (Figure 1, Item 25), screw (Figure 1, Item 26), and manual control lever (Figure 1, Item 27) from butterfly valve (Figure 1, Item 6).

DISASSEMBLY – CONTINUED

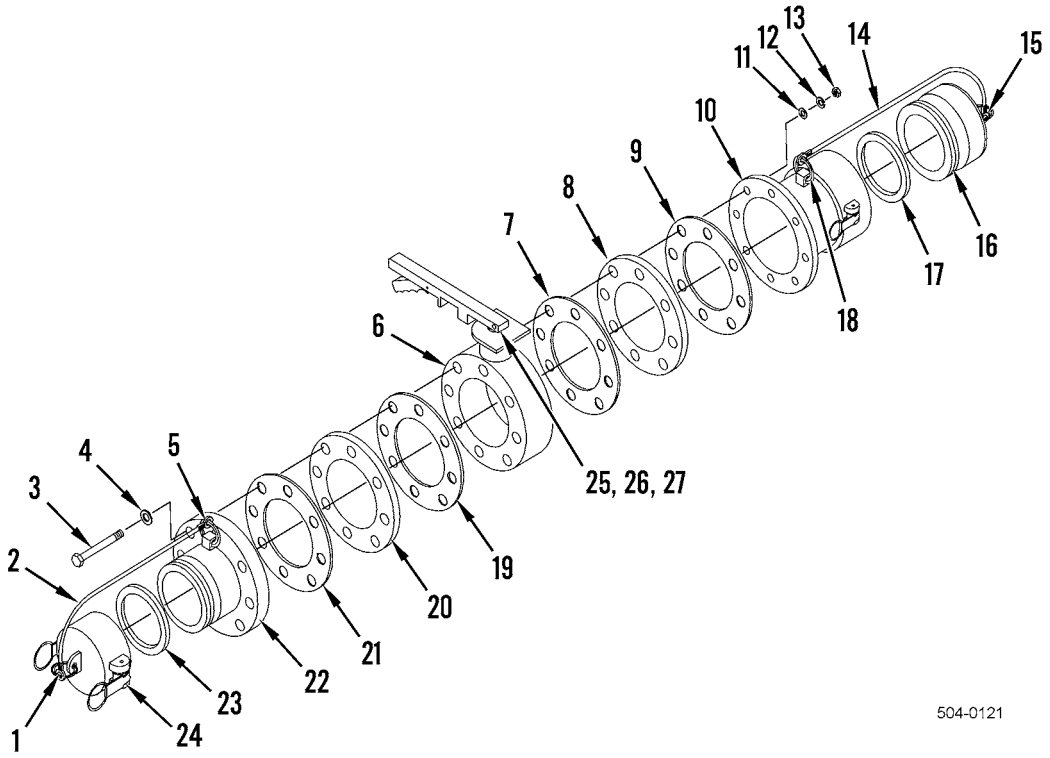


Figure 1. Camlock Adapter.

END OF TASK

CLEAN

WARNING

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1. Remove all buildup of dirt, oil, and debris from all mating surfaces and clamping areas.
2. Clean all metallic parts with a cleaning cloth and solvent cleaning compound.
3. Allow parts to dry thoroughly.

END OF TASK

ASSEMBLY

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Install manual control lever (Figure 2, Item 27), screw (Figure 2, Item 26), and nut (Figure 2, Item 25) on butterfly valve (Figure 2, Item 6).
2. Install split rings (Figure 2, Items 15 and 18) to chain (Figure 2, Item 14).
3. Install split rings (Figure 2, Items 15 and 18) to coupling (Figure 2, Item 10) and quick disconnect dust plug (Figure 2, Item 16).
4. Install split rings (Figure 2, Items 1 and 5) to chain (Figure 2, Item 2).
5. Install split rings (Figure 2, Items 1 and 5) to quick disconnect dust cap (Figure 2, Item 24) and male coupling adapter (Figure 2, Item 22).
6. Position coupling (Figure 2, Item 22), new gasket (Figure 2, Item 21), flange pipe (Figure 2, Item 20), new gasket (Figure 2, Item 19), butterfly valve (Figure 2, Item 6), new gasket (Figure 2, Item 7), flange pipe (Figure 2, Item 8), new gasket (Figure 2, Item 9), and coupling (Figure 2, Item 10).
7. Install eight screws (Figure 2, Item 3) and washers (Figure 2, Item 4) through coupling (Figure 2, Item 22), gasket (Figure 2, Item 21,), flange pipe (Figure 2, Item 20), gasket (Figure 2, Item 19), butterfly valve (Figure 2, Item 6), gasket (Figure 2, Item 7), flange pipe (Figure 2, Item 8), gasket (Figure 2, Item 9), and coupling (Figure 2, Item 10).
8. Install eight washers (Figure 2, Item 11), new lockwashers (Figure 2, Item 12), and nuts (Figure 2, Item 13) to screws (Figure 2, Item 3). Torque nuts to 27-33 lb-ft (37-45 Nm).
9. Install quick disconnect dust cap (Figure 2, Item 24) and gasket (Figure 2, Item 23) to coupling (Figure 2, Item 22).
10. Install quick disconnect dust plug (Figure 2, Item 16) and gasket (Figure 2, Item 17) to coupling (Figure 2, Item 10).

ASSEMBLY – CONTINUED

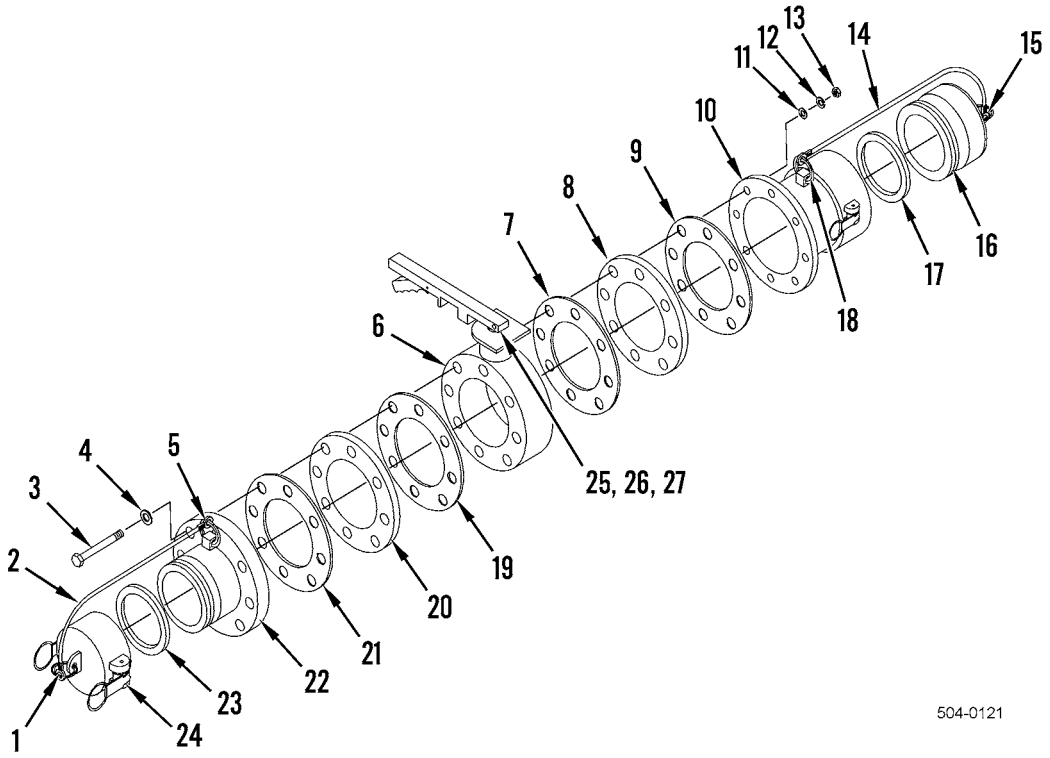


Figure 2. Camlock Adapter.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

CAMLOCK ADAPTER BRACKET REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Materials/Parts

Nut, self-locking, hex (WP 0154, Item 18) (4)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

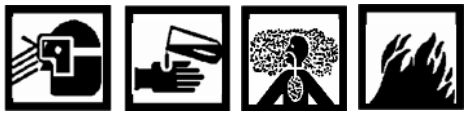
WP 0142

Equipment Condition

TRM shut down (WP 0022)

REMOVAL

WARNING



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Remove four locknuts (Figure 1, Item 3), screws (Figure 1, Item 1), and bracket (Figure 1, Item 2). Discard locknuts.

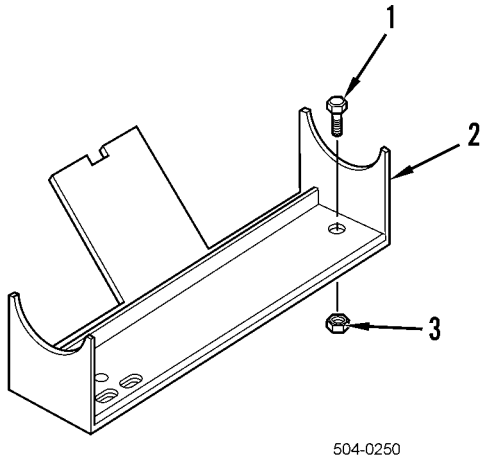


Figure 1. Camlock Adapter Bracket.

END OF TASK

INSTALLATION

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

Install bracket (Figure 2, Item 2), four screws (Figure 2, Item 1), and new locknuts (Figure 2, Item 3).

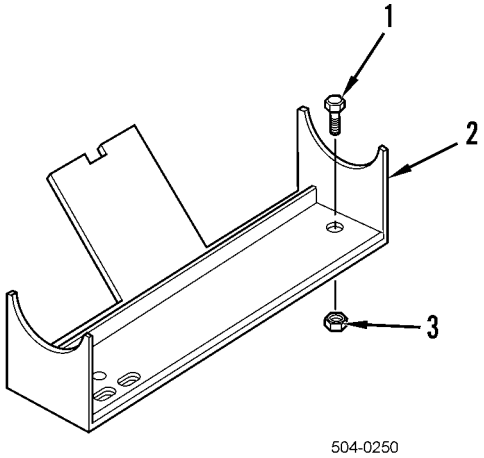


Figure 2. Camlock Adapter Bracket.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

TEE ASSEMBLY REPAIR
Disassembly, Clean, Assembly

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)
Standard automotive tool set (SATS) (WP 0151, Item 5)
Wrench, torque, 0-175 lb-ft (WP 0151, Item 7)

Materials/Parts

Cleaning compound, solvent (WP 0153, Item 2)
Cloth, cleaning (WP 0153, Item 5)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)

Materials/Parts - Continued

Gasket (WP 0154, Item 3) (6)
Washer, lock (WP 0154, Item 40) (24)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0143

Equipment Condition

TRM shut down (WP 0022)

DISASSEMBLY

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Remove dust cap (Figure 1, Item 7) from flanged coupling (Figure 1, Item 11).
2. Remove gasket (Figure 1, Item 6) from dust cap (Figure 1, Item 7).
3. Remove split ring (Figure 1, Item 8) from chain (Figure 1, Item 9) and dust cap (Figure 1, Item 7).
4. Remove split ring (Figure 1, Item 10) from chain (Figure 1, Item 9) and flanged coupling (Figure 1, Item 11).
5. Remove eight nuts (Figure 1, Item 3), lockwashers (Figure 1, Item 2), washers (Figure 1, Item 1), and washers (Figure 1, Item 4) from screws (Figure 1, Item 5) from flanged coupling (Figure 1, Item 11) and flanged tee (Figure 1, Item 13). Discard lockwashers.
6. Remove flanged coupling (Figure 1, Item 11) and gasket (Figure 1, Item 12) from tee (Figure 1, Item 13). Discard gasket.
7. Remove dust plug (Figure 1, Item 21) from coupling (Figure 1, Item 19).
8. Remove gasket (Figure 1, Item 20) from coupling (Figure 1, Item 19).
9. Remove split ring (Figure 1, Item 22) from chain (Figure 1, Item 23) and dust plug (Figure 1, Item 21).
10. Remove split ring (Figure 1, Item 24) from chain (Figure 1, Item 23) and coupling (Figure 1, Item 19).
11. Remove eight nuts (Figure 1, Item 29), lockwashers (Figure 1, Item 30), and washers (Figure 1, Item 31) from screws (Figure 1, Item 23). Discard lockwashers.
12. Remove eight screws (Figure 1, Item 25) and washers (Figure 1, Item 26) from coupling (Figure 1, Item 19).
13. Remove coupling (Figure 1, Item 19), gasket (Figure 1, Item 18), adapter flange (Figure 1, Item 17), and gasket (Figure 1, Item 16) from butterfly valve (Figure 1, Item 15). Discard gaskets.
14. Remove butterfly valve (Figure 1, Item 15), gasket (Figure 1, Item 27), adapter flange (Figure 1, Item 28), and gasket (Figure 1, Item 14) from flanged tee (Figure 1, Item 13). Discard gaskets.
15. Remove dust plug (Figure 1, Item 37) from coupling (Figure 1, Item 33).
16. Remove gasket (Figure 1, Item 38) from coupling (Figure 1, Item 33).
17. Remove split ring (Figure 1, Item 36) from chain (Figure 1, Item 35) and dust plug (Figure 1, Item 37).
18. Remove split ring (Figure 1, Item 34) from chain (Figure 1, Item 35) and coupling (Figure 1, Item 33).
19. Remove eight nuts (Figure 1, Item 41), lockwashers (Figure 1, Item 42), and washers (Figure 1, Item 43) from screws (Figure 1, Item 39). Discard lockwashers.
20. Remove eight screws (Figure 1, Item 39) and washers (Figure 1, Item 40) from coupling (Figure 1, Item 33).
21. Remove coupling (Figure 1, Item 33) and gasket (Figure 1, Item 32) from flanged tee (Figure 1, Item 13). Discard gasket.
22. Remove nut (Figure 1, Item 46) from screw (Figure 1, Item 44).
23. Remove manual control lever (Figure 1, Item 45) from butterfly valve (Figure 1, Item 15).

DISASSEMBLY – CONTINUED

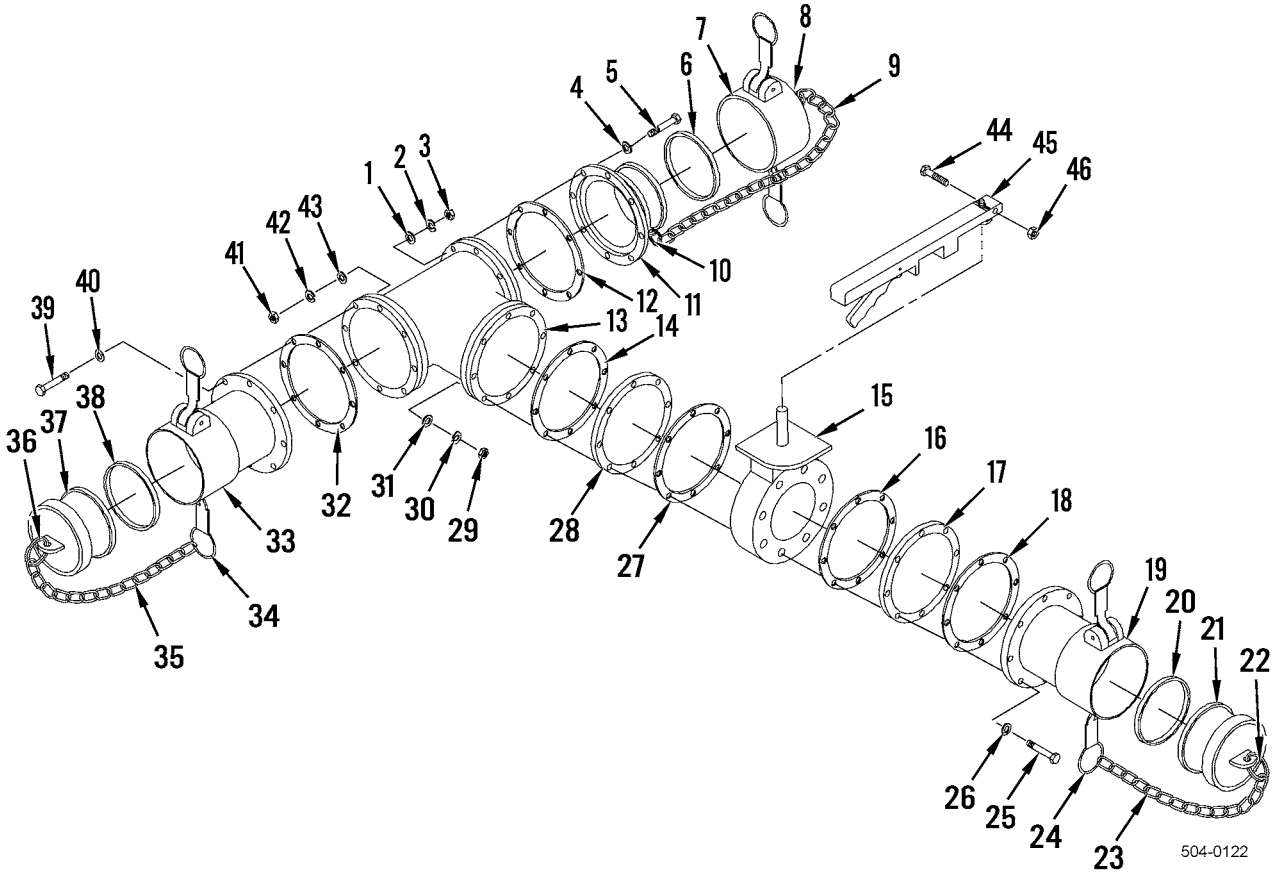
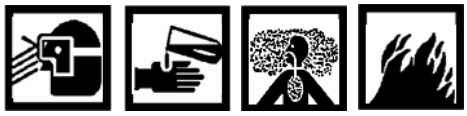


Figure 1. Tee Assembly.

END OF TASK

CLEAN

WARNING



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1. Remove all buildup of dirt, oil and debris from all mating surfaces and clamping areas.
2. Clean all metallic parts with a cleaning cloth and solvent cleaning compound.
3. Allow parts to dry thoroughly.

END OF TASK

ASSEMBLY

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Position coupling (Figure 2, Item 33) and new gasket (Figure 2, Item 32) on flanged tee (Figure 2, Item 13), aligning all eight holes.
2. Install eight screws (Figure 2, Item 39) with washers (Figure 2, Item 40) through coupling (Figure 2, Item 33), gasket (Figure 2, Item 32) and flanged tee (Figure 2, Item 13).
3. Install eight washers (Figure 2, Item 43), new lockwashers (Figure 2, Item 42), and nuts (Figure 2, Item 41) on screws (Figure 2, Item 39).
4. Torque nuts (Figure 2, Item 41) to 27–33 lb-ft (37–45 Nm).
5. Install split ring (Figure 2, Item 34) on chain (Figure 2, Item 35) to coupling (Figure 2, Item 33).
6. Install split ring (Figure 2, Item 36) on chain (Figure 2, Item 35) to dust plug (Figure 2, Item 37).
7. Install new gasket (Figure 2, Item 38) in coupling (Figure 2, Item 33).
8. Install dust plug (Figure 2, Item 37) on coupling (Figure 2, Item 33).
9. Position butterfly valve (Figure 2, Item 15), new gasket (Figure 2, Item 27), adapter flange (Figure 2, Item 28), and new gasket (Figure 2, Item 14) to flanged tee (Figure 2, Item 13) aligning all eight holes.
10. Position coupling (Figure 2, Item 19), new gasket (Figure 2, Item 18), adapter flange (Figure 2, Item 17), and new gasket (Figure 2, Item 14) to butterfly valve (Figure 2 Item 15), aligning all eight holes.
11. Install eight screws (Figure 2, Item 25) with washers (Figure 2, Item 26) through coupling (Figure 2, Item 19), gasket (Figure 2, Item 18), adapter flange (Figure 2, Item 17) gasket (Figure 2, Item 16), butterfly valve (Figure 2, Item 15), gasket (Figure 2, Item 27), adapter flange (Figure 2, Item 28), and gasket (Figure 2, Item 14) to flanged tee (Figure 2, Item 13).
12. Install eight washers (Figure 2, Item 31) new lockwashers (Figure 2, Item 30), and nuts (Figure 2, Item 29) on eight screws (Figure 2, Item 25).
13. Torque nuts (Figure 2, Item 29) to 27-33 lb-ft (37-45 Nm).
14. Install split ring (Figure 2, Item 24) on chain (Figure 2, Item 23) and coupling (Figure 2, Item 19).
15. Install split ring (Figure 2, Item 22) on chain (Figure 2, Item 23) and dust plug (Figure 2, Item 21).
16. Install gasket (Figure 2, Item 20) on coupling (Figure 2, Item 19).
17. Install dust plug (Figure 2, Item 21) on coupling (Figure 2, Item 19).
18. Position flanged coupling (Figure 2, Item 11) and new gasket (Figure 2, Item 12) on flanged tee (Figure 2, Item 13), aligning all eight holes.
19. Install eight screws (Figure 2, Item 5) with washers (Figure 2, Item 4) through flanged coupling (Figure 2, Item 11) and gasket (Figure 2, Item 12) to flanged tee (Figure 2, Item 13).
20. Install eight flat washers (Figure 2, Item 1), new lockwashers (Figure 2, Item 2), nuts (Figure 2, Item 3) on screws (Figure 2, Item 5).
21. Torque nuts (Figure 2, Item 3) to 27–33 lb-ft (37–45 Nm).
22. Install split ring (Figure 2, Item 10) on chain (Figure 2, Item 9) and flanged coupling (Figure 2, Item 11).

ASSEMBLY – CONTINUED

23. Install split ring (Figure 2, Item 8) on chain (Figure 2, Item 9) and dust cap (Figure 2, Item 7).
24. Install gasket (Figure 2, Item 6) in dust cap (Figure 2, Item 7).
25. Install dust cap (Figure 2, Item 7) on flanged coupling (Figure 2, Item 11).
26. Install manual control lever (Figure 2, Item 45) on butterfly valve (Figure 2, Item 15).
27. Install nut (Figure 2, Item 46) on screw (Figure 2, Item 44).

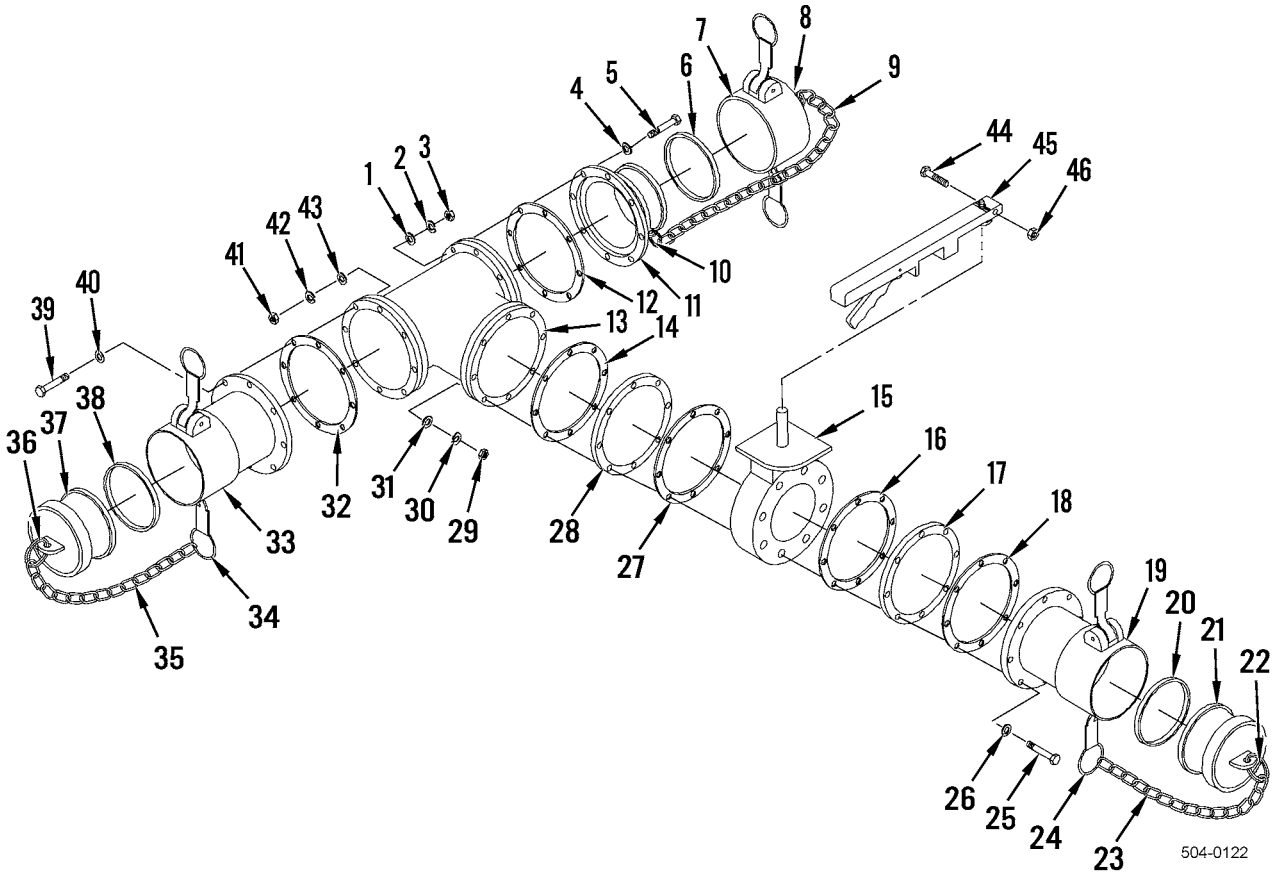


Figure 2. Tee Assembly.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

TEE ASSEMBLY BRACKET REPLACEMENT
Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Material/Parts

Nut, self-locking, hex (WP 0154, Item 18) (3)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

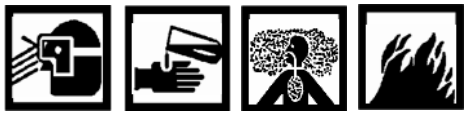
WP 0143

Equipment Condition

TRM shut down (WP 0022)

REMOVAL

WARNING



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1. Remove three screws (Figure 1, Item 1) and locknuts (Figure 1, Item 4) securing bracket (Figure 1, Item 2) to TRM frame (Figure 1, Item 3). Discard locknuts.
2. Remove bracket (Figure 1, Item 2) from TRM frame (Figure 1, Item 3).

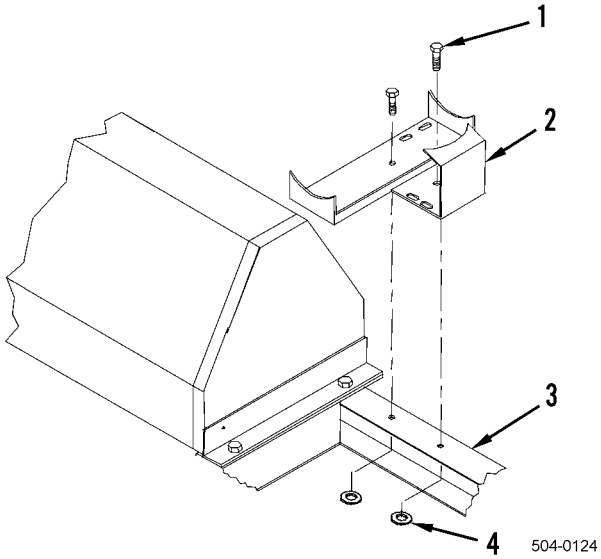

Figure 1. Tee Assembly Bracket.

END OF TASK

INSTALLATION

WARNING

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1. Position bracket (Figure 2, Item 2) on TRM frame (Figure 2, Item 3).
2. Install three screws (Figure 2, Item 1) and new locknuts (Figure 2, Item 4) to secure bracket (Figure 2, Item 2) to TRM frame (Figure 2, Item 3).

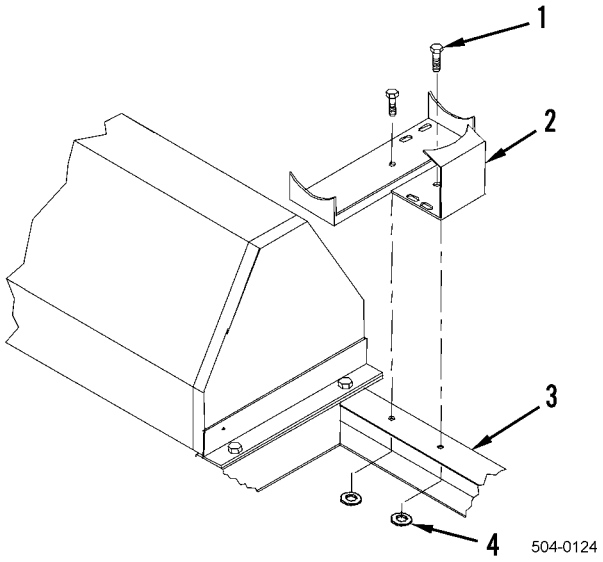

Figure 2. Tee Assembly Bracket.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

FLANGE ADAPTER ASSEMBLY REPAIR
Disassembly, Clean, Assembly

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (WP 0151, Item 6)

Material/Parts

Cleaning compound, solvent (WP 0153, Item 2)
Cloth, abrasive (WP 0153, Item 4)
Gloves, rubber, industrial (WP 0153, Item 6)
Goggles, industrial (WP 0153, Item 7)
O-ring (WP 0154, Item 19)
Washer, lock (WP 0154, Item 33) (6)

Personnel Required

Quartermaster and Chemical Equipment Repairer 91J

References

WP 0144

Equipment Condition

TRM shut down (WP 0022)

DISASSEMBLY

WARNING

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1. Remove coupling half (Figure 1, Item 4) from adapter flange (Figure 1, Item 2).
2. Remove gasket (Figure 1, Item 3) and chain (Figure 1, Item 5) from coupling half (Figure 1, Item 4).
3. Remove six screws (Figure 1, Item 6), lockwashers (Figure 1, Item 7), washers (Figure 1, Item 8), and adapter flange (Figure 1, Item 2) from nozzle (Figure 1, Item 1). Discard lockwashers.
4. Remove O-ring (Figure 1, Item 9) from nozzle (Figure 1, Item 1). Discard O-ring.

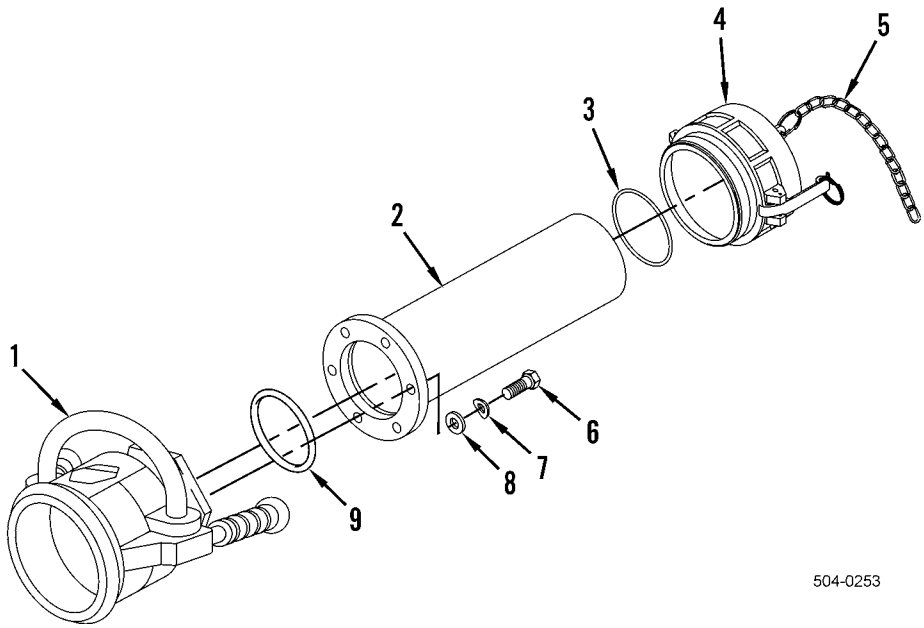
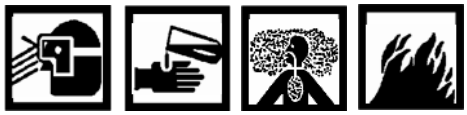


Figure 1. Flange Adapter Assembly.

END OF TASK

CLEAN

WARNING



Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition. Failure to comply may cause injury or death to personnel.

1. Remove all buildup of dirt, oil and debris from all mating surfaces and clamping areas.
2. Clean all metallic parts with a cleaning cloth and solvent cleaning compound.
3. Allow parts to dry thoroughly.

END OF TASK

ASSEMBLY

WARNING

Goggles and gloves must be worn when working around fuel. Do not smoke, use open flame, make sparks, or create other ignition sources around fuel. Avoid contact with eyes and skin. Avoid prolonged or repeated breathing of vapors and ensure there is adequate ventilation. Always have a fire extinguisher on the ground next to the TRM prior to the transfer of fuel. Failure to comply could result in injury or death to personnel.

1. Install new O-ring (Figure 1, Item 9) in nozzle (Figure 1, Item 1).
2. Install adapter flange (Figure 1, Item 2), six washers (Figure 1, Item 8), new lockwashers (Figure 1, Item 7), and screws (Figure 1, Item 6) on nozzle (Figure 1, Item 1).
3. Install chain (Figure 1, Item 5) and gasket (Figure 1, Item 3) on coupling half (Figure 1, Item 4).
4. Install coupling half (Figure 1, Item 4) on adapter flange (Figure 1, Item 2).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

TORQUE LIMITS

When To Use Torque Limits, When To Use Adapters with Torque Wrenches, How To Use Adapters With Torque Wrenches, How To Use Torque Tables

WHEN TO USE TORQUE LIMITS

When a torque is not specified in an individual work package, use the procedures in this work package to determine proper torque limits and use of adapters with torque wrenches.

WHEN TO USE ADAPTERS WITH TORQUE WRENCHES

When an adapter is necessary due to space or type of fitting being torqued, it must be determined how the adapter changes the amount of force applied. If the adapter increases or decreases the distance from the drive of the torque wrench to the fitting being torqued, an equation must be used to compensate for the difference.

HOW TO USE ADAPTERS WITH TORQUE WRENCHES

NOTE

The following abbreviations apply to the below procedures:

- DT = Desired Torque
- LT = Length of Torque Wrench
- AL = Adapter Length
- AT = Applied Torque

1. If the adapter used decreases the distance between the center of the torque wrench handle and the center of the drive, first find the desired torque for the fitting, then calculate as follows:
   a. Multiply DT by LT.
   b. Subtract AL from LT.
   c. Divide the first answer by the second answer to find AT.

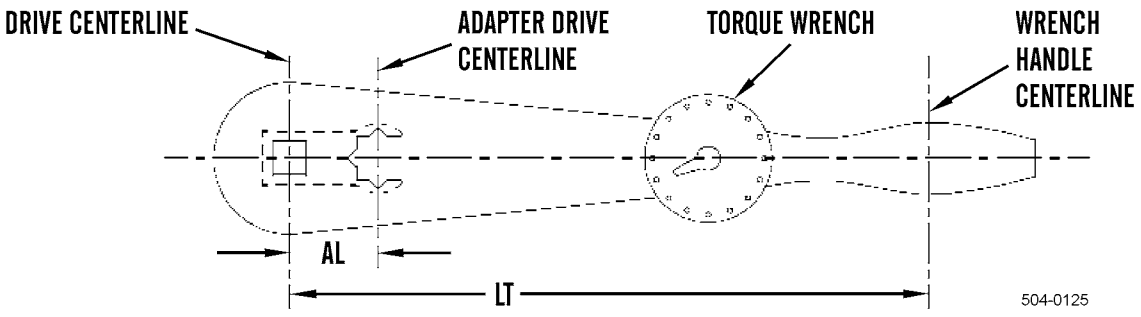


Figure 1. Torque Wrench.

HOW TO USE ADAPTERS WITH TORQUE WRENCHES – CONTINUED

2. If the adapter used increases the distance between the center of the torque wrench handle and the center of the drive, first find the desired torque for the fitting, then calculate as follows:
   a. Multiply DT by LT.
   b. Add AL and LT.
   c. Divide the first answer by the second answer to find AT.

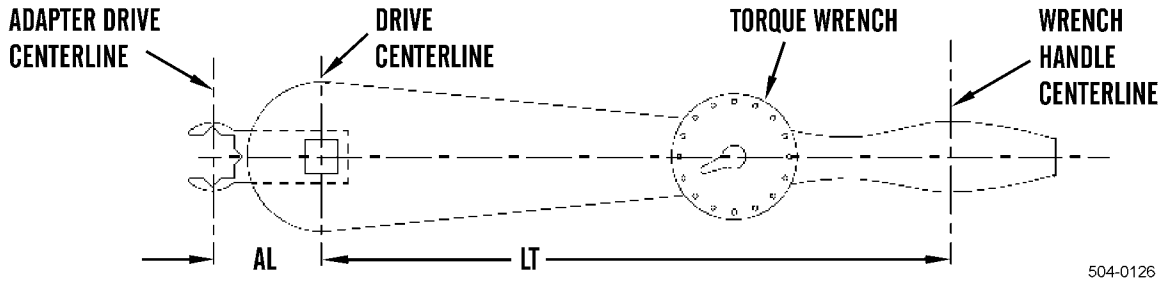


Figure 2. Torque Wrench.

HOW TO USE TORQUE TABLES

1. Measure the diameter of the bolt to be torqued.

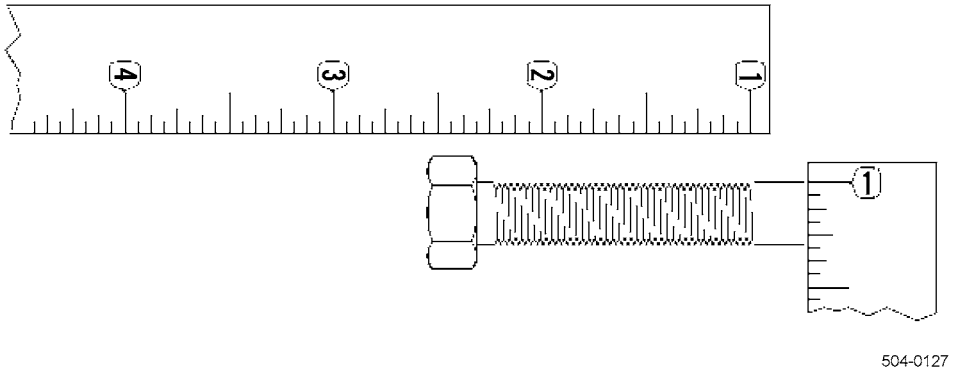


Figure 3. Torque Wrench Measurement.

HOW TO USE TORQUE TABLES – CONTINUED

2. For Society of Automotive Engineers (SAE) fasteners, determine the threads per in. by counting the threads. For metric fasteners, determine the thread pitch using a thread pitch gage.
3. Determine the type of markings on the bolt you are torquing by comparing the markings on the head of the bolt with the chart below.

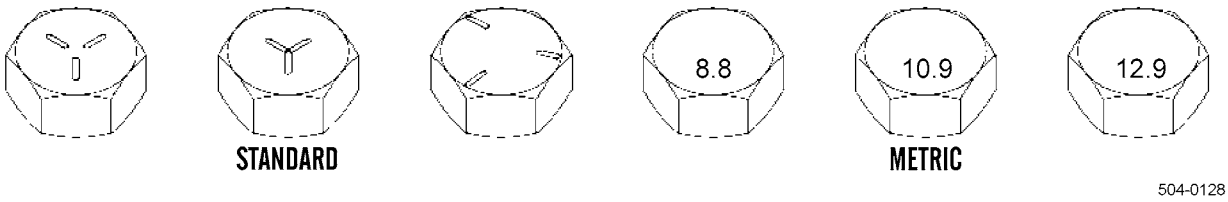
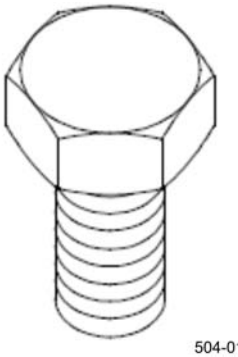
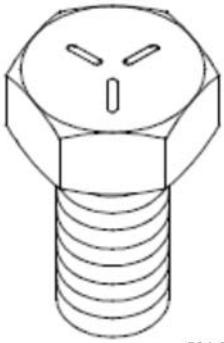
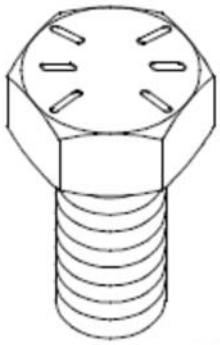


Figure 4. Torque Wrench Standard and Metric.

4. Determine if this will be a wet or dry torque.
   a. Wet torque is any bolt that is lubricated or coated with an antiseize compound.
   b. Dry torque is any bolt that is not lubricated or coated with an antiseize compound.
5. In Tables 1 thru 4, locate the bolt to be torqued.
   a. Locate the diameter of the bolt.
   b. Determine the threads per inch for the SAE fastener or the thread pitch for the metric fastener.
   c. Slide across the table to the proper grade.
   d. Choose wet or dry.
   e. Slide down the proper column and across the proper row until they intersect, this is the proper torque value.

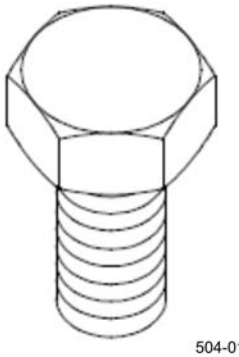
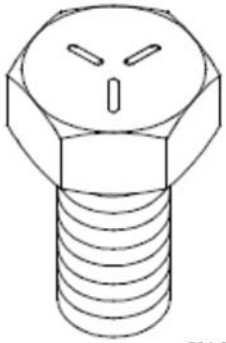
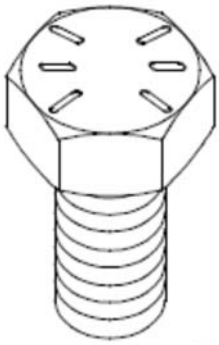
HOW TO USE TORQUE TABLES – CONTINUED

Table 1. SAE Standard Torque.

		SAE GRADE NO. 2				SAE GRADE NO. 5				SAE GRADE NO. 8			
		 504-0129				 504-0130				 504-0131			
		DRY		WET		DRY		WET		DRY		WET	
DIA IN.	THREADS PER IN.	IN-LB	NM	IN-LB	NM	IN-LB	NM	IN-LB	NM	IN-LB	NM	IN-LB	NM
1/4	20	66	7.46	49	5.54	101	11.41	76	8.58	143	16.15	107	12.09
1/4	28	75	8.47	56	6.33	116	13.10	87	9.83	164	18.53	123	13.89
5/16	18	135	15.25	101	11.41	209	23.61	157	17.73	295	33.32	221	24.96
5/16	24	150	17.17	112	12.65	230	25.98	173	19.54	327	36.94	245	27.68
3/8	16	240	27.11	180	20.33	370	41.80	278	31.40	523	59.08	392	44.28
3/8	24	272	30.73	204	23.04	420	47.44	315	35.58	593	66.99	445	50.27
7/16	14	384	43.38	288	32.53	593	66.99	445	50.27	837	94.55	628	70.94
7/16	20	428	48.35	321	36.26	662	74.78	496	56.03	935	105.62	700	79.07
1/2	13	585	66.08	439	49.59	904	102.12	678	76.59	1277	144.25	958	108.22
1/2	20	660	74.55	495	55.92	1020	115.22	764	86.30	1440	162.66	1080	122.00

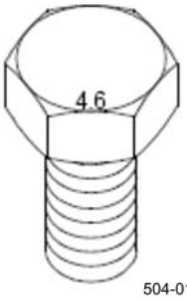
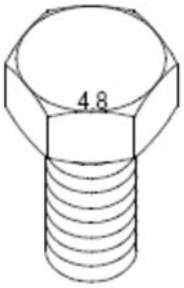
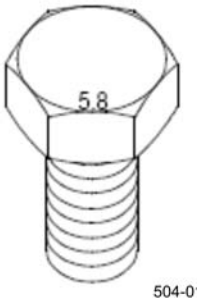
HOW TO USE TORQUE TABLES – CONTINUED

Table 2. SAE Standard Torque.

		SAE GRADE NO. 2				SAE GRADE NO. 5				SAE GRADE NO. 8			
		 504-0129				 504-0130				 504-0131			
		DRY		WET		DRY		WET		DRY		WET	
DIA IN.	THREADS PER IN.	FT-LB	NM	FT-LB	NM	FT-LB	NM	FT-LB	NM	FT-LB	NM	FT-LB	NM
9/16	12	70	94.92	53	71.87	109	147.80	82	111.19	154	208.82	115	155.94
9/16	18	78	105.77	59	80.00	121	164.08	91	123.40	171	231.88	128	173.57
5/8	11	97	131.53	73	98.99	150	203.40	113	153.23	212	287.47	159	215.60
5/8	18	110	149.16	82	111.19	170	230.52	127	172.21	240	325.44	180	244.08
3/4	10	172	233.23	129	174.92	269	364.76	201	272.56	376	509.86	282	382.39
3/4	16	192	260.35	144	195.26	297	402.73	223	302.29	420	569.52	315	427.14
1	8	--		--		644	873.26	483	654.95	909	1232.60	683	926.15
1	12	--		--		704	954.62	528	715.97	995	1349.22	746	1011.58

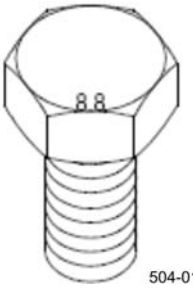
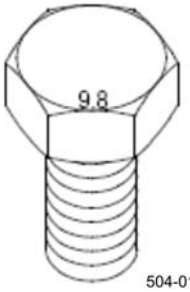
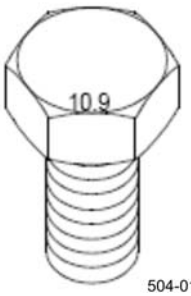
HOW TO USE TORQUE TABLES – CONTINUED

Table 3. Metric Torque.

		CLASS 4.6				CLASS 4.8				CLASS 5.8			
		 504-0132				 504-0133				 504-0134			
		DRY		WET		DRY		WET		DRY		WET	
DIA IN.	THREADS PITCH	NM	IN-LB	NM	IN-LB	NM	IN-LB	NM	IN-LB	NM	IN-LB	NM	IN-LB
3.0	0.5	.50	4	.40	4	.70	6	.50	4	-	-	-	-
3.5	0.6	.80	7	.60	5	1.10	10	.80	7	-	-	-	-
4.0	0.7	1.20	11	.90	8	1.60	14	1.20	11	-	-	-	-
5.0	0.8	2.40	21	1.80	16	3.30	29	2.50	22	4.00	35	3.00	27
6.0	1.0	4.00	35	3.00	27	5.66	50	4.20	37	6.90	61	5.20	46
8.0	1.25	9.90	88	7.40	66	13.60	120	10.20	90	16.70	148	12.50	111
10.	1.50	19.60	174	14.70	130	27.00	239	20.00	177	33.10	293	24.80	220
12.0	1.75	34.10	302	25.60	227	47.00	416	35.00	310	58.00	513	43.00	381
14.0	2.0	54.30	481	40.80	361	75.00	664	56.00	496	92.00	814	69.00	611

HOW TO USE TORQUE TABLES – CONTINUED

Table 4. Metric Standard Torque.

		CLASS 8.8				CLASS 9.8				CLASS 10.9			
		 504-0135				 504-0136				 504-0137			
		DRY		WET		DRY		WET		DRY		WET	
DIA IN.	THREADS PITCH	NM	FT-LB	NM	FT-LB	NM	FT-LB	NM	FT-LB	NM	FT-LB	NM	FT-LB
8.0	1.25	26.40	19	19.80	15	28.50	21	21.40	16	36.50	27	27.30	20
10.0	1.50	52.20	38	39.20	29	56.60	42	42.40	31	72.20	53	54.20	40
12.0	1.75	91.00	67	68.00	50	99.00	73	74.00	55	126.00	93	94.00	69
14.0	2.00	145.00	107	109.00	80	157.00	116	118.00	87	200.00	147	150.00	111
16.0	2.00	226.00	167	170.00	125	245.00	181	184.00	136	313.00	231	235.00	173
20.0	2.50	441.00	325	331.00	244	478.00	353	358.00	264	610.00	450	458.00	338
24.0	3.00	762.00	562	572.00	422	826.00	609	620.00	457	1055.00	778	791.00	583
30.0	3.50	1515.00	1117	1136.00	838	1641.00	1210	1231.00	908	2095.00	1545	1572.00	1159
36.0	4.00	2647.00	1952	1985.00	1464	2868.00	2115	2151.00	1586	3662.00	2701	2746.00	2025

END OF WORK PACKAGE

CHAPTER 7

PARTS INFORMATION

FIELD MAINTENANCE

REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL) INTRODUCTION

Scope, General, Explanation of Columns in the Repair Parts Lists and Special Tools List, Explanation of Cross-Reference Indexes Format and Columns, Special Information, How to Locate Repair Parts, Abbreviations

SCOPE

This RPSTL lists and authorizes spares and repair parts for performance of Field level maintenance of the Modular Fuel System Tank Rack Module (MFS TRM). It authorizes the requisitioning, issue, and disposition of spares and repair parts as indicated by the source, maintenance, and recoverability (SMR) codes.

GENERAL

In addition to the Introduction work package, this RPSTL is divided into the following work packages:

a. **Repair Parts List Work Packages.** Work packages containing lists of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. These work package also include parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Sending units, brackets, filters, and bolts are listed with the component they mount on. Bulk materials are listed by item name in FIG. BULK at the end of the work package. Repair parts kits are listed separately in their own functional group. Items listed are shown on the associated illustrations.

b. **Special Tools List Work Package.** Work package containing lists of special tools, special TMDE, and special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in the DESCRIPTION AND USABLE ON CODE (UOC) column). Tools that are components of common tool sets and/or class VII are not listed

c. **Cross-Reference Indexes Work Package.** There are two cross-reference indexes in this RPSTL: National Stock Number Index and Part Number Index.

EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES

1. **Item No. (Column 1).** Indicates the number used to identify items called out in the illustration.
2. **SMR Code (Column 2).** The SMR code containing supply/requisitioning information, maintenance level authorization criteria, and disposition instructions, as shown in the following breakout. This entry may be subdivided into 4 subentries, one for each service:

SOURCE CODE	MAINTENANCE CODE		RECOVERABILITY CODE
XXxxx	xxXXx		xxxxX
1st two positions	3rd position	4th position	5th position
How you get an item.	Who can install, replace, or use the item.	Who can do complete repair* on the item.	Who determines disposition action on an unserviceable item.

* *Complete Repair:* Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the *"Repair"* function in a use/user environment in order to restore serviceability to a failed item.

EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES – CONTINUED

a. **Source Code.** The source code tells you how to get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follow:

Source Code	Application/Explanation
PA PB PC PD PE PF PG PH PR PZ	**NOTE** *Items coded PC are subject to deterioration.* Stock items; use the applicable NSN to request/requisition items with these source codes. They are authorized to the maintenance category indicated by the code entered in the third position of the SMR code.
KD KF KB	Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance level indicated in the third position of the SMR code. The complete kit must be requisitioned and applied.
MF - Made at Field/ASB Level MH - Made at Below Depot Sustainment Level ML - Made at SRA MD - Made at Depot MG - Navy only	Items with these codes are not to be requested/requisitioned individually. They must be made from bulk material which is identified by the part number in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the bulk material group section of the RPSTL. If the item is authorized to you by the third position of the SMR code, but the source code indicates it is made at a higher level, order the item from the higher level of maintenance.
AF - Assembled by Field Level AH - Assembled by Below Depot Sustainment Level AL - Assembled by SRA AD - Assembled by Depot AG - Navy only	Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the third position of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.
XA	Do not requisition an “XA” coded item. Order the next higher assembly (refer to NOTE below).
XB	If an item is not available from salvage, order it using the CAGEC and part number.
XC	Installation drawings, diagrams, instruction sheets, field service drawings; identified by manufacturer’s part number.
XD	Item is not stocked. Order an XD-coded item through local purchase or normal supply channels using the CAGEC and part number given, if no NSN is available.

EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES – CONTINUED

NOTE

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes, except for those source coded "XA" or those aircraft support items restricted by requirements of AR 750-1.

b. **Maintenance Code.** Maintenance codes tell you the level(s) of maintenance authorized to use and repair support items. The maintenance codes are entered in the third and fourth positions of the SMR code as follows:

(a) Third Position. The maintenance code entered in the third position tells you the lowest maintenance level authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to the following levels of maintenance:

Maintenance Code	Application/Explanation
F	Field maintenance can remove, replace, and use item.
H	Below Depot Sustainment maintenance can remove, replace, and use item.
L	Specialized Repair Activity (SRA) can remove, replace, and use item.
G	Afloat and ashore intermediate maintenance can remove, replace, and use item (Navy only).
K	Contractor facility can remove, replace, and use item.
Z	Item is not authorized to be removed, replaced, or used at any maintenance level.
D	Depot can remove, replace, and use item.

* *Note:* Army may use C in the third position. However, for joint service publications, Army will use O.

(b) Fourth Position. The maintenance code entered in the fourth position tells you whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (perform all authorized repair functions).

NOTE

Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.

Maintenance Code	Application/Explanation
F	Field is the lowest level that can do complete repair of item.
H	Below Depot Sustainment is the lowest level that can do complete repair of item.
L	Specialized Repair Activity (SRA) is the lowest level that can do complete repair of item.
D	Depot is the lowest level that can do complete repair of item.
G	Both afloat and ashore intermediate levels are capable of complete repair of item (Navy only).
K	Complete repair is done at contractor facility.
Z	Nonrepairable. No repair authorized.

EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES – CONTINUED

B . . . . . No repair authorized. No parts or special tools are authorized for maintenance of "B" coded item. However, item may be reconditioned by adjusting, lubricating, etc., at user level.

c. **Recoverability Code.** Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR code as follows:

Code	Application/Explanation
Z	Nonrepairable item. When unserviceable, condemn and dispose of item at the level of maintenance shown in the third position of the SMR code.
F	Repairable item. When uneconomically repairable, condemn and dispose of item at Field level.
H	Repairable item. When uneconomically repairable, condemn and dispose of item at the below Depot Sustainment level.
D	Repairable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item are not authorized below depot level.
L	Repairable item. Condemnation and disposal of item not authorized below Specialized Repair Activity (SRA).
A	Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.
G	Field level repairable item. Condemn and dispose at either afloat or ashore intermediate levels (Navy only).
K	Repairable item. Condemnation and disposal to be performed at contractor facility.

3. **NSN - (Column 3).** The NSN for the item is listed in this column.
4. **CAGEC (Column 4).** The Commercial and Government Entity Code (CAGEC) is a five-digit code which is used to identify the manufacturer, distributor, or Government agency/activity that supplies the item.
5. **PART NUMBER (Column 5).** Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

NOTE

When you use an NSN to requisition an item, the item you receive may have a different part number from the part listed.

6. **DESCRIPTION AND USABLE ON CODE (UOC) (Column 6).** This column includes the following information:
   a. The Federal item name and, when required, a minimum description to identify the item.
   b. Part numbers of bulk materials are referenced in this column in the line entry to be manufactured or fabricated.
   c. Hardness Critical Item (HCI). A support item that provides the equipment with special protection from electromagnetic pulse (EMP) damage during a nuclear attack.
   d. The statement END OF FIGURE appears just below the last item description in column (6) for a given figure in both the repair parts list and special tools list work packages.

EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES – CONTINUED

7. **QTY (Column 7).** The QTY (quantity per figure) column indicates the quantity of the item used in the breakout shown on the illustration/figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that the quantity is variable and quantity may change from application to application.

EXPLANATION OF CROSS-REFERENCE INDEXES WORK PACKAGES FORMAT AND COLUMNS

1. **National Stock Number (NSN) Index Work Package.**
   a. **STOCK NUMBER Column.** This column lists the NSN in NIIN sequence. The NIIN consists of the last nine digits of the NSN. When using this column to locate an item, ignore the first four digits of the NSN. However, the complete NSN should be used when ordering items by stock number. For example, if the NSN is 5385-01-574-1476, the NIIN is 01-574-1476.
   b. **FIG. Column.** This column lists the number of the figure where the item is identified/located. The figures are in numerical order in the repair parts list and special tools list work packages.
   c. **ITEM Column.** The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.
2. **Part Number (P/N) Index Work Package.** Part numbers in this index are listed in ascending alphanumeric sequence (vertical arrangement of letter and number combination which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order).
   a. **PART NUMBER Column.** Indicates the part number assigned to the item.
   b. **FIG. Column.** This column lists the number of the figure where the item is identified/located in the repair parts list and special tools list work packages.
   c. **ITEM Column.** The item number is the number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

SPECIAL INFORMATION

1. **Usable On Code (UOC).** The UOC appears in the lower left corner of the description column heading. Usable on codes are shown as "UOC:" in the Description Column (justified left) on the first line under the applicable item/nomenclature. Uncoded items are applicable to all models. Identification of the UOCs used in the RPSTL are:

Code	Used On
MTR	Modular Fuel System Tank Rack Module

HOW TO LOCATE REPAIR PARTS

1. **When NSNs or Part Numbers Are Not Known.**
   a. **First.** Using the table of contents, determine the assembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and lists are divided into the same groups.
   b. **Second.** Find the figure covering the functional group or the subfunctional group to which the item belongs.
   c. **Third.** Identify the item on the figure and note the number(s).
   d. **Fourth.** Look in the repair parts lists for the figure and items numbers. The NSNs and part numbers are on the same line as the associated item numbers.

HOW TO LOCATE REPAIR PARTS – CONTINUED

2. **When National Stock Number is Known.**
   a. **First.** If you have the NSN, look in the STOCK NUMBER column of the NSN index. The NSN is arranged in NIIN sequence. Note the figure and item number next to the NSN.
   b. **Second.** Turn to the figure and locate the item number. Verify that the item is the one you are looking for.
3. **When Part Number is Known.**
   a. **First.** If you have the P/N and not the NSN, look in the PART NUMBER column of the P/N index. Identify the figure and item number.
   b. **Second.** Look up the item on the figure in the applicable repair parts list work package.

ABBREVIATIONS

For standard abbreviations, see ASME Y14.38-2007, *Abbreviations and Acronyms*.

Abbreviation	Explanation
NIIN	National Item Identification Number (consists of the last 9 digits of the NSN)
NSN	National Stock Number
RPSTL	Repair Parts and Special Tools Lists
SMR	Source, Maintenance, and Recoverability Code
TMDE	Test, Measurement, and Diagnostic Equipment

END OF WORK PACKAGE

FIELD MAINTENANCE

ISO TANK RACK MODULE

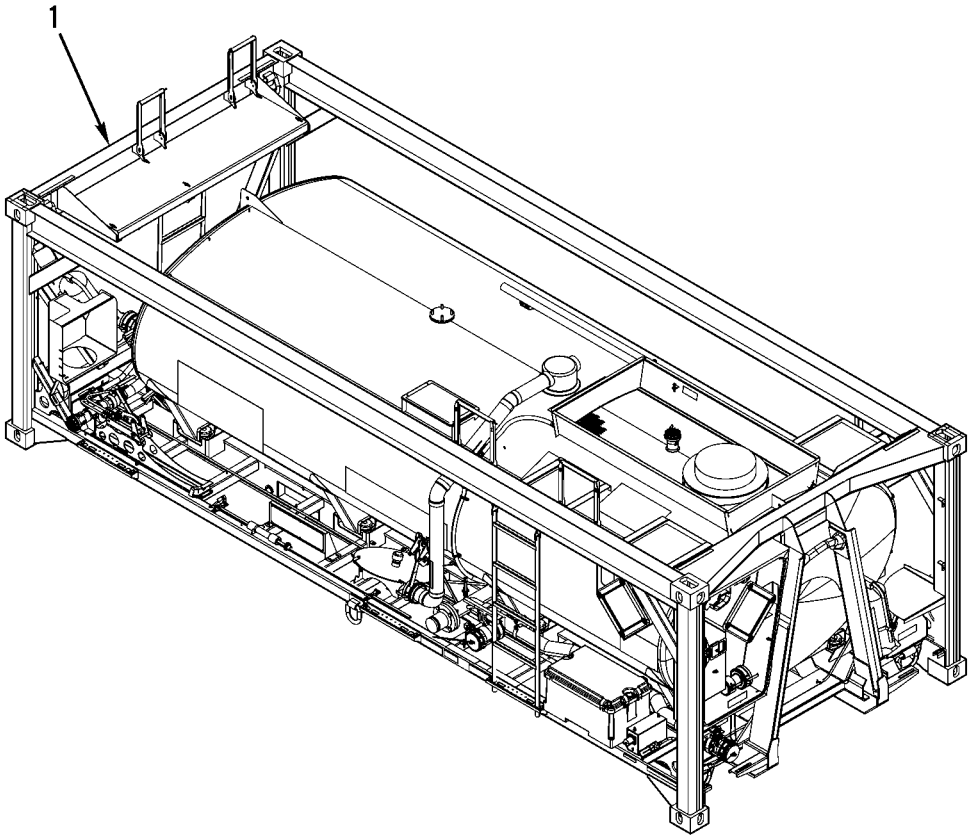


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Figure 1. ISO Tank Rack Module.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 01	
					GROUP 0100	
					FIG. 1 ISO TANK RANK MODULE	
1	PAFHH	4930015176939	98255	811000-1	TANK UNIT,FUEL DISPENSING,TRUCK MOUNTING	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

MANHOLE COVER/TRANSPORTER COVER

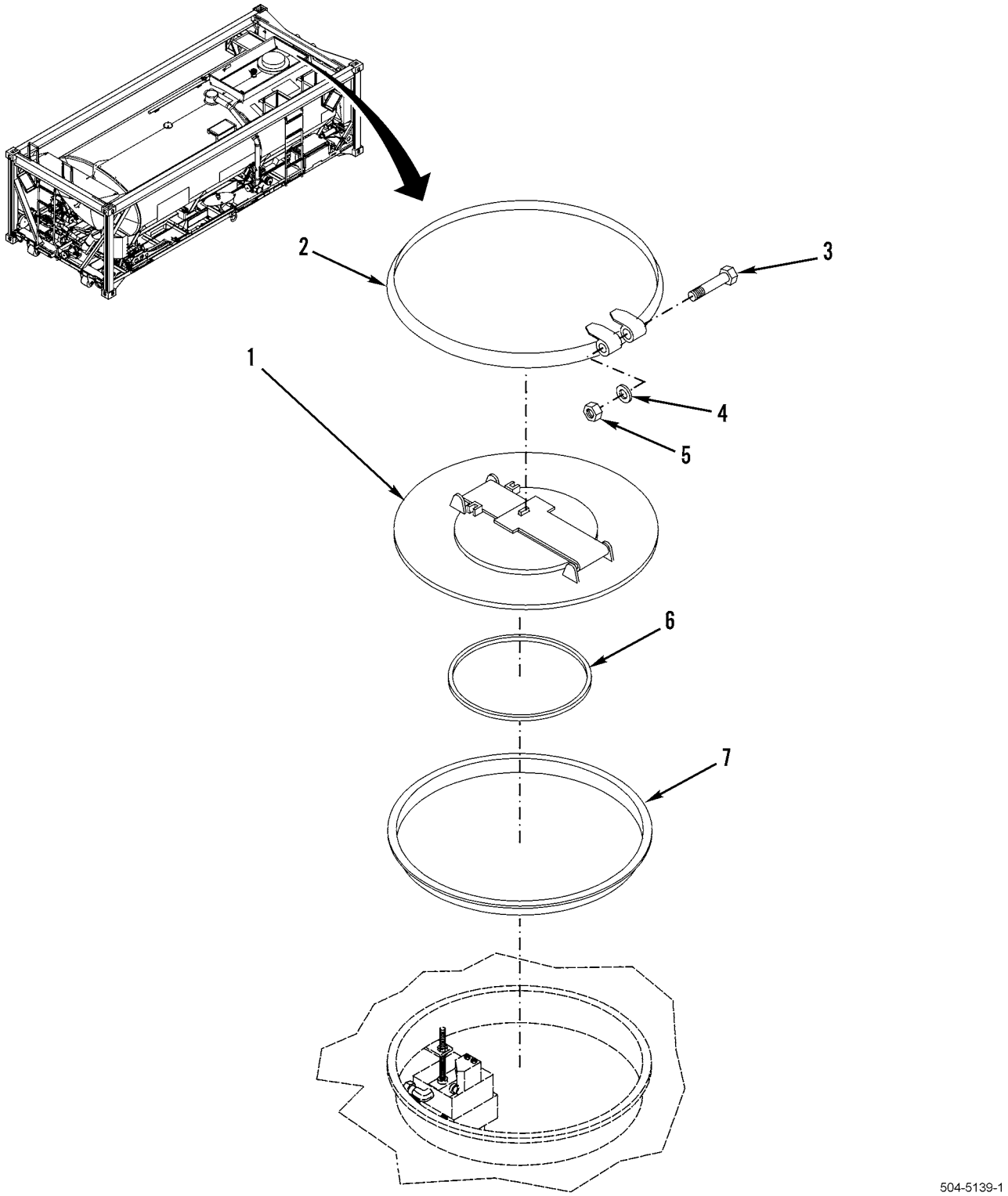

Figure 2. Manhole Cover/Transporter Cover (Sheet 1 of 2)

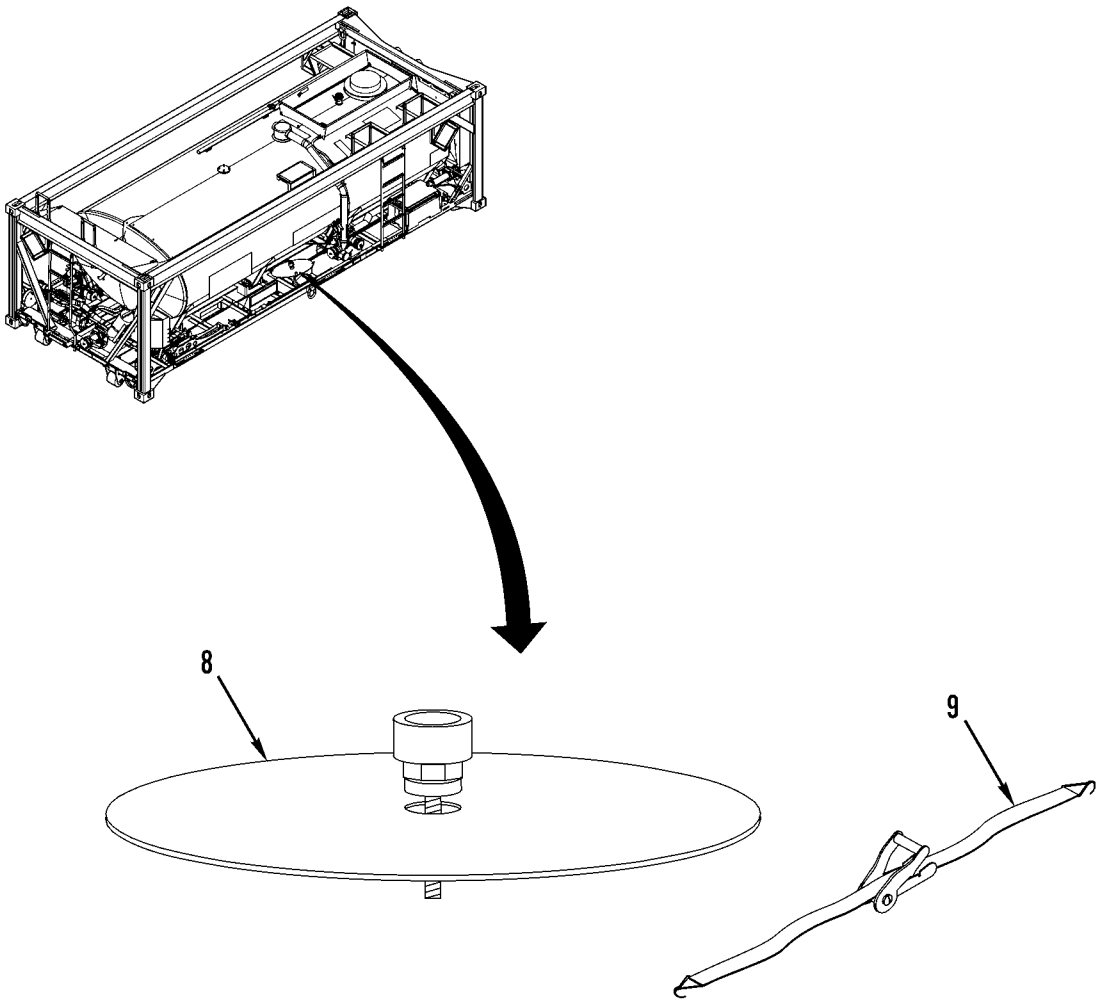

Figure 2. Manhole Cover/Transporter Cover (Sheet 2 of 2)

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0101	
					FIG. 2 MANHOLE COVER/TRANSPORTER COVER	
1	PBFZZ		80195	6603764	MANHOLE 20"	1
2	PBFZZ	5365001382158	13226	3036SL	RING,CLAMPING	1
3	PAFZZ	5306010775119	13226	3029SL	BOLT,MACHINE	1
4	PAFZZ	5310010776773	13226	3031-SL	WASHER	1
5	PAFZZ	5310007320558	96906	MS51967-8	NUT,PLAIN,HEXAGON	1
6	PCFZZ	5330010242311	13226	3119BN	PACKING,PREFORMED	1
7	PCFZZ	5330011341986	13226	3560BN	GASKET	1
8	PBFZZ	2040015827522	80195	5251389	COVER,MANHOLE	1
9	PAFZZ		80195	6001716	STRAP 24"	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

HOSE TROUGH ASSEMBLY

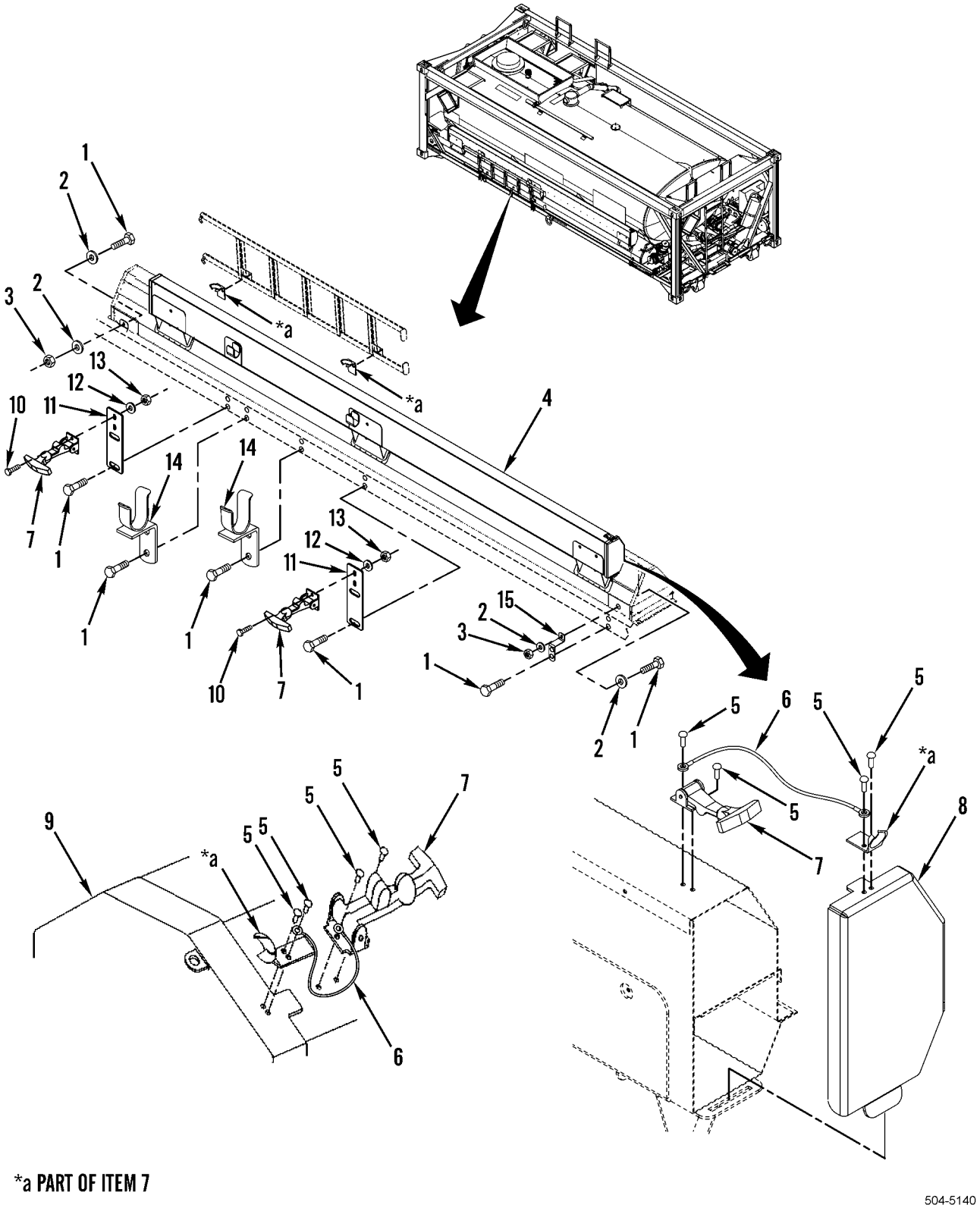

Figure 3. Hose Trough Assembly.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0102	
					FIG. 3 HOSE TROUGH ASSEMBLY	
1	PAFZZ	5305005434372	80204	B1821BH038C075N	SCREW,CAP,HEXAGON HEAD	14
2	PAFZZ	5310010831540	80195	0120388	WASHER,FLAT	8
3	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	4
4	PAFZZ		80195	5251737	TROUGH ASSEMBLY	1
5	PAFZZ		94222	38-106-04-16	RIVET	20
6	PAFZZ		39428	30345T5	LANYARD	3
7	PAFZZ	5340014241221	94222	37-20-086-10	CATCH,CLAMPING	6
8	PAFZZ		80195	5251726	TROUGH DOOR	1
9	PAFZZ		80195	5251292	DOOR 192" HOSE THRU	2
10	PAFZZ	5305013083838	39428	90276A424	SCREW,MACHINE	4
11	PAFZZ		80195	5251691	BRACKET	2
12	PAFZZ	5310013578847	39428	91114A031	WASHER,LOCK	4
13	PAFZZ	5310012517510	39428	90780A011	NUT,PLAIN,HEXAGON	4
14	PAFZZ		80195	5251738	SADDLE,LADDER STOWAGE	2
15	PAFZZ		80195	5251701	BRACKET,HOSE TROUGH TIEDOWN	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

ISO RACK LADDERS

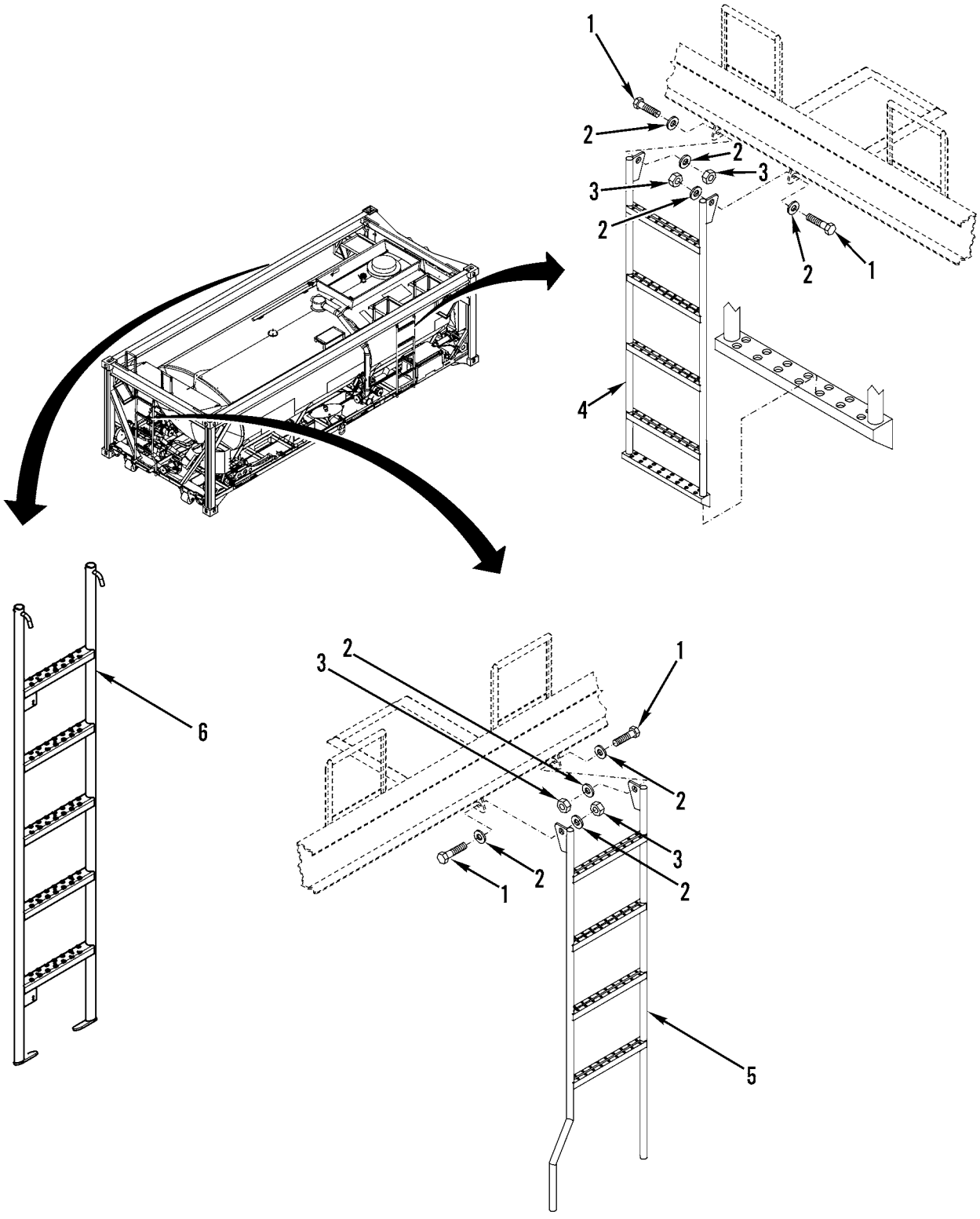

Figure 4. ISO Rack Ladders.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0103	
					FIG. 4 ISO RACK LADDERS	
1	PAFZZ	5305009789394	80205	NAS1352-6-16P	BOLTS 3/8 NC	4
2	PAFZZ	5310010831540	80195	0120388	WASHER,FLAT	8
3	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	4
4	PBFZZ		80195	5250819	LADDER	1
5	PBFZZ		80195	5251675	LADDER,REAR	1
6	PBFZZ		80195	5251662	LADDER,STOWABLE	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

ISO RACK HANDLES

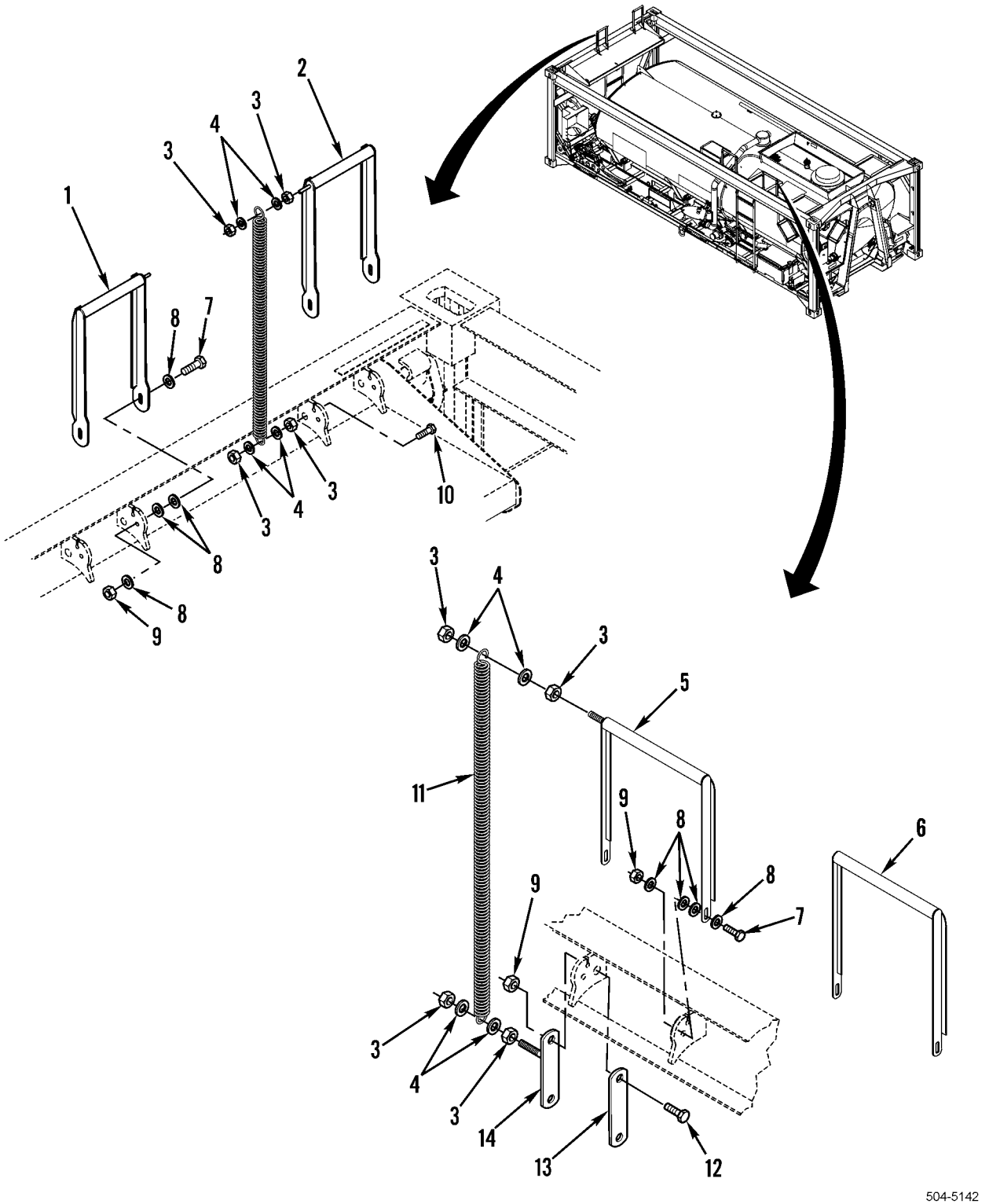

Figure 5. ISO Rack Handles.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0104	
					FIG. 5 ISO RACK HANDLES	
1	PAFZZ		80195	5251278	HANDLE FOLD LH NARW	1
2	PAFZZ		80195	5251277	HANDLE,FOLDING RH W	1
3	PAFZZ	5310000881251	81349	M45913/1-4CG5C	NUT,SELF-LOCKING,HEXAGON	16
4	PAFZZ	5310008238804	96906	MS27183-9	WASHER,FLAT	16
5	PAFZZ		80195	5251263	HNDL FOLD HD LH	1
6	PAFZZ		80195	5251257	HANDLE FOLDING RH	1
7	PAFZZ	5305000680511	80204	B1821BH038C125N	SCREW,CAP,HEX HEAD	8
8	PAFZZ	5310010831540	80195	0120388	WASHER,FLAT	16
9	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	12
10	PAFZZ		80195	0121973	BOLT,.25NC X 2.75	4
11	PAFZZ		39428	94135K44	EXT. SPRING	4
12	PAFZZ		80195	0122017	CAPSCREW	4
13	PAFZZ		80195	5251259	PLATE HANDLE	2
14	PAFZZ		80195	5251264	PLATE ASSY,RH	1
14	PAFZZ		80195	5251265	PLATE ASSY,LH	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

ISO RACK PLACARDS

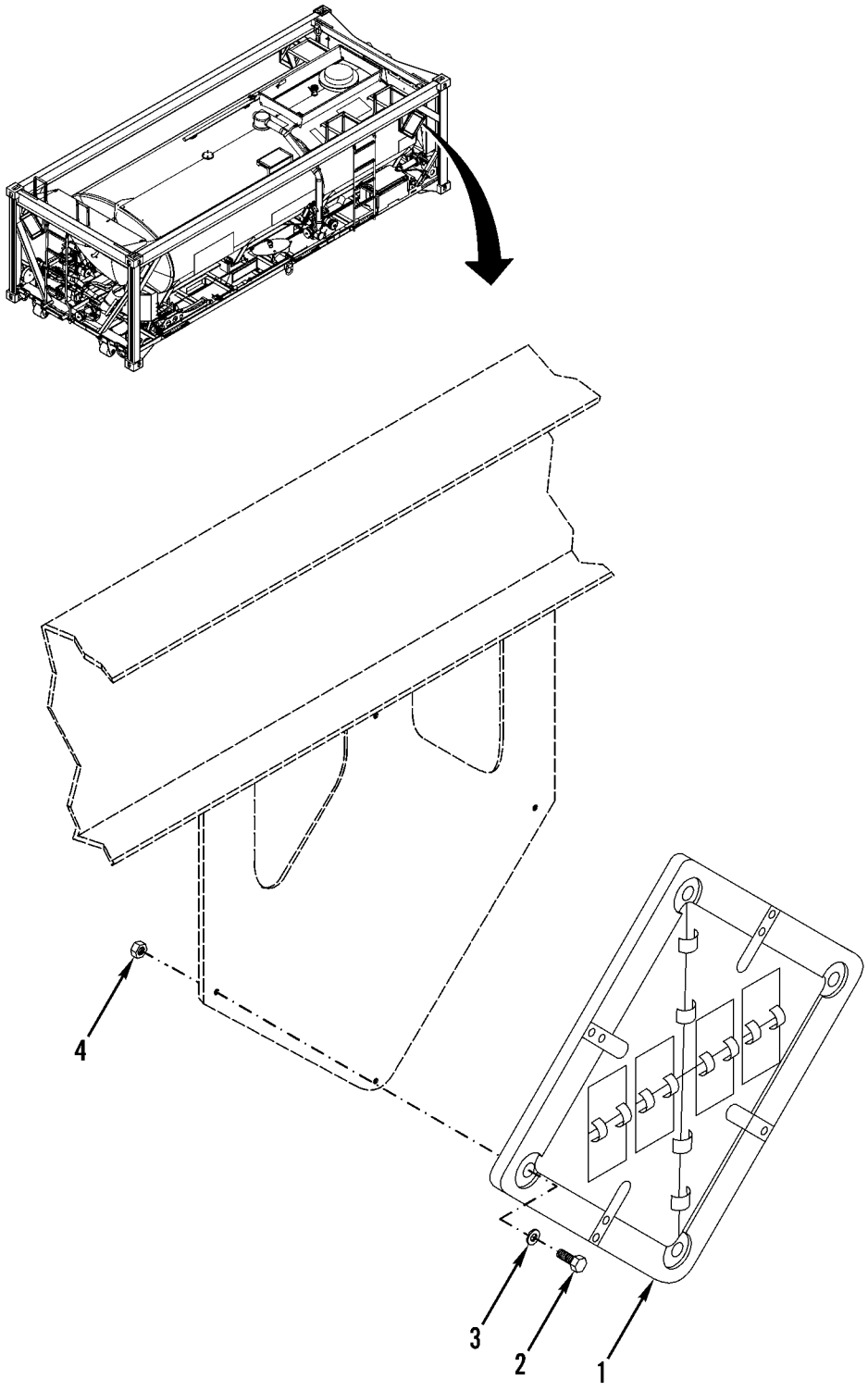

Figure 6. ISO Rack Placards.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0105	
					FIG. 6 ISO RACK PLACARDS	
1	PAFZZ	9905013795693	19207	12380149	PLATE,INSTRUCTION	4
2	PAFZZ	5305015731548	07070	92196A245	SCREW,CAP,SOCKET HEAD	14
3	PAFZZ	5310015537188	39428	91100A170	WASHER,FLAT	14
4	PAFZZ		39428	90045A016	NUT,PLAIN,LOCKING	14
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

TOOL BOX

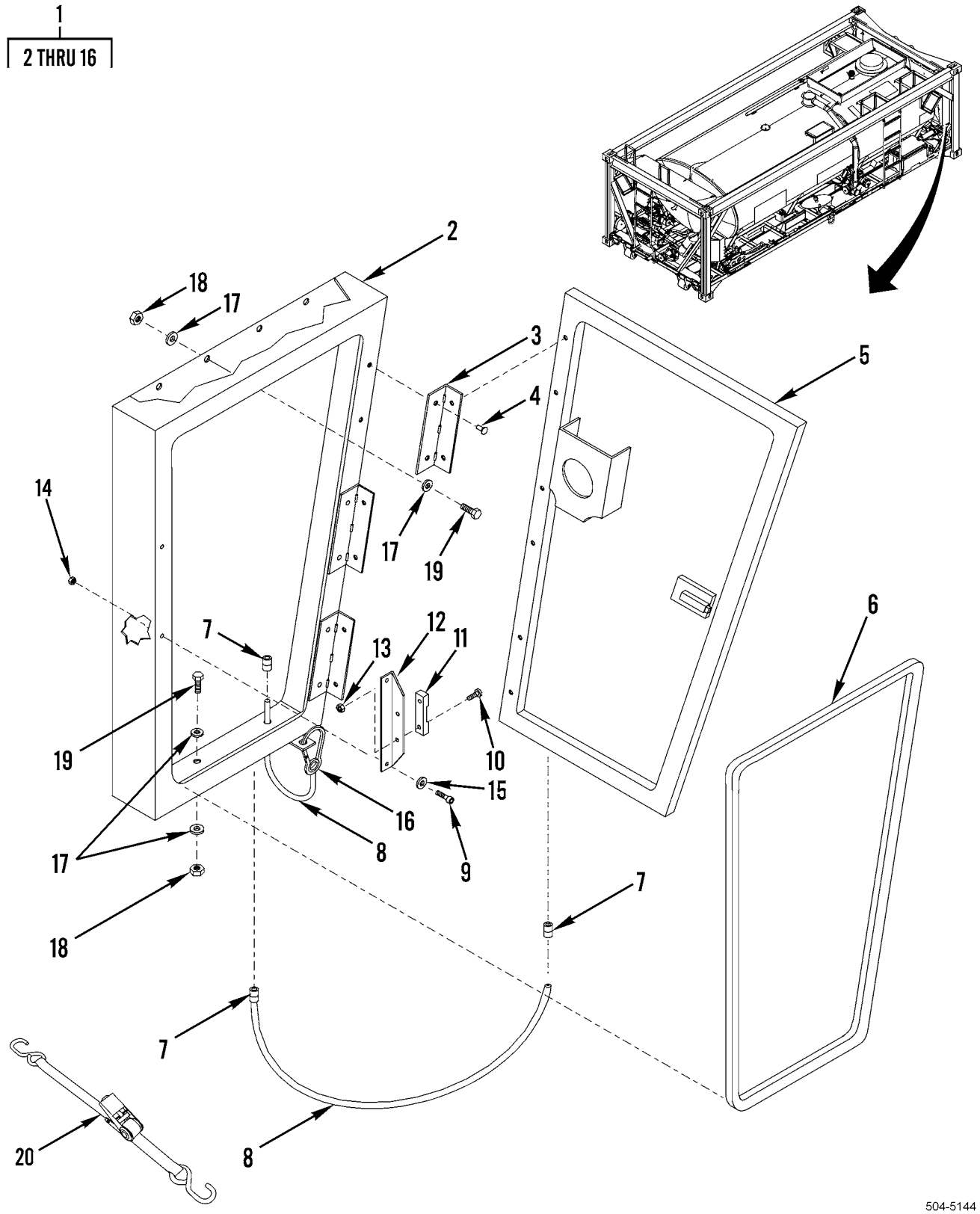

Figure 7. Tool Box.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0106	
					FIG. 7 TOOL BOX	
1	PBFFF		80195	5251627	TOOL BOX CABINET	1
2	PAFZZ		80195	5250969	.BASE	1
3	PAFZZ		80195	5250973	.HINGE	3
4	PAFZZ	5320012713318	39428	97525A415	.RIVET,BLIND	18
5	PAFZZ		80195	5250968	.DOOR,TOOLBOX	1
6	PCFZZ		80195	5250980	.SEAL	1
7	PAFZZ		39428	3936T14	.SLEEVE	3
8	PAFZZ		80195	5251119	.CABLE,DOOR STOP	2
9	PAFZZ		80195	6001679	.SCREW	2
10	PAFZZ		80195	6001675	.SCREW	2
11	PAFZZ		80195	5251397	.STRIKE	1
12	PAFZZ		80195	5251386	.STRIKER-FRAME	1
13	PAFZZ		80195	6001676	.NUT,HEX	2
14	PAFZZ	5310000124818	24617	124818	.NUT,PLAIN,HEXAGON	2
15	PAFZZ	5310008238804	96906	MS27183-9	.WASHER,FLAT	2
16	PAFZZ		39428	3079T44	.CLIP,SPRING SNAP	1
17	PAFZZ	5310010831540	80195	0120388	WASHER,FLAT	12
18	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	6
19	PAFZZ	5305015048288	2V507	92865A622	SCREW,CAP,SOCKET HEAD	6
20	PAFZZ		80195	6001716	STRAP 24"	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

STATIC GROUND REELS

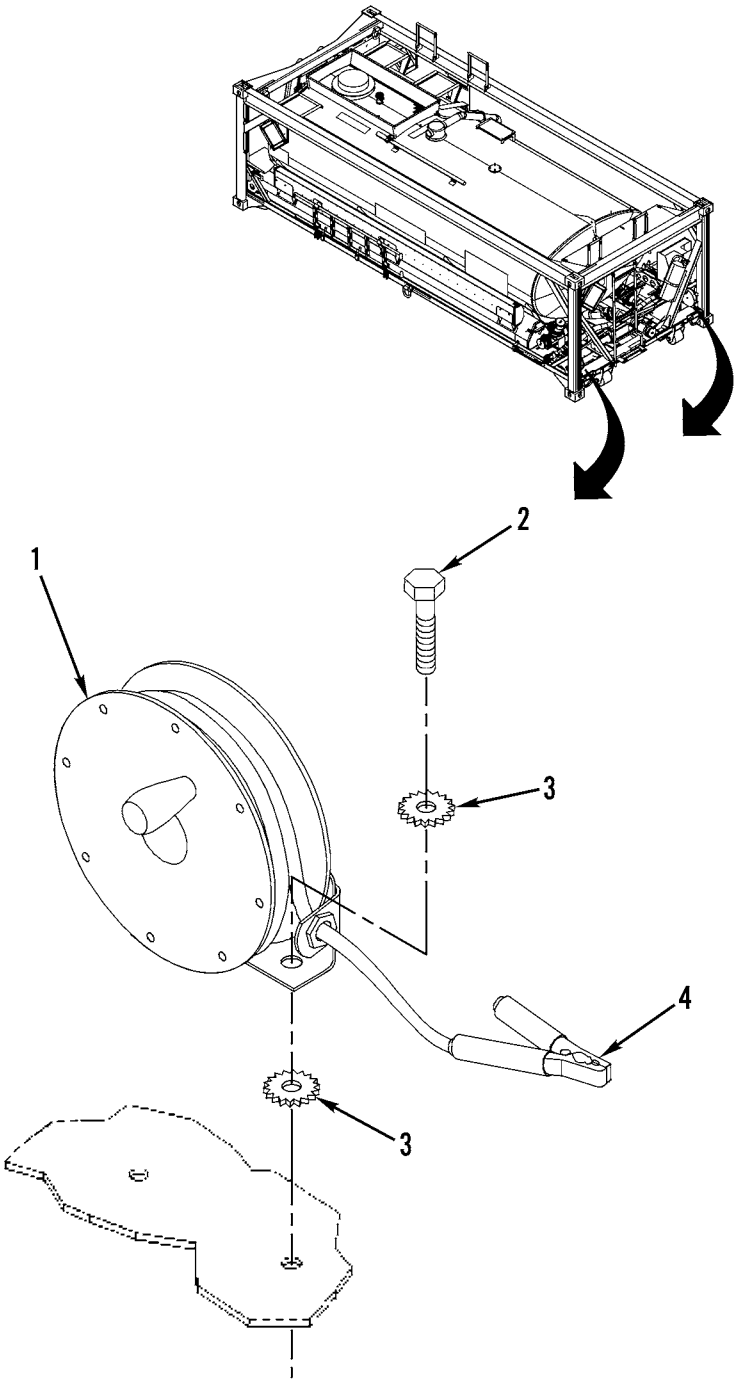

Figure 8. Static Ground Reels.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0107	
					FIG. 8 STATIC GROUND REELS	
1	PAFZZ		92858	MGR75-20	GROUND REEL MAN 20"	2
2	PAFZZ	5305005434372	80204	B1821BH038C075N	SCREW,CAP,HEXAGON HEAD	4
3	PAFZZ	5310015492705	39428	91114A033	WASHER,LOCK	8
4	PAFZZ		K9089	9951.0031	CLAMP	2
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

GROUND ROD

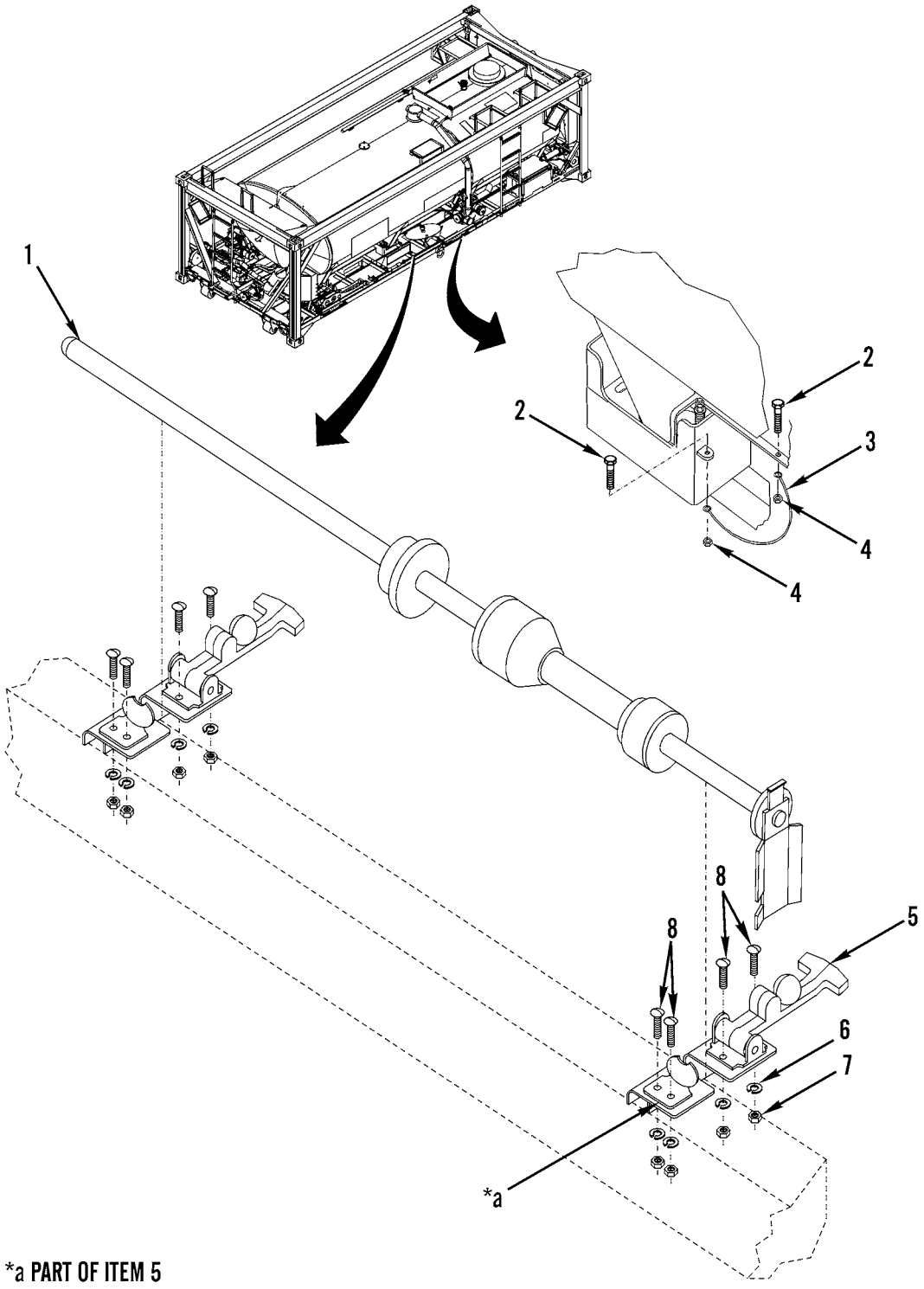

Figure 9. Ground Rod.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0108	
					FIG. 9 GROUND ROD	
1	PAFZZ	5975010505707	19207	13219E0462	ROD,GROUND	1
2	PAFZZ	5305015175475	39428	92620A624	SCREW,CAP,HEXAGON HEAD	2
3	PAFZZ		80195	6703627	CABLE STP,TANK GRD	1
4	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	2
5	PAFZZ	5340014241221	94222	37-20-086-10	CATCH,CLAMPING	2
6	PAFZZ	5310013578847	39428	91114A031	WASHER,LOCK	8
7	PAFZZ	5310012517510	39428	90480A011	NUT,PLAIN,HEXAGON	8
8	PAFZZ	5305013083838	39428	90276A424	SCREW,MACHINE	8
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

COMPRESSION SPRINGS

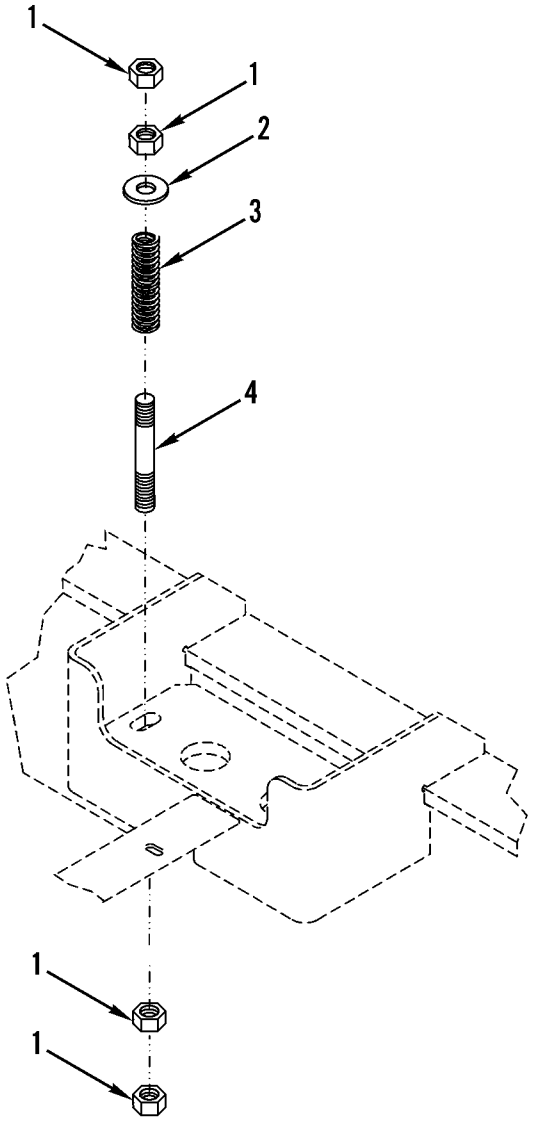

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Figure 10. Compression Springs.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0109	
					FIG. 10 COMPRESSION SPRINGS	
1	PAFZZ		39428	92501A030	SELFLOCK,NUT,HEX	48
2	PAFZZ	5310010882491	80195	0130999	WASHER,FLAT	12
3	PAFZZ	5360015408782	80195	6001225	SPRING,HELICAL,COMPRESSION	12
4	PAFZZ		80195	3311945	STUD,TIE DOWN SS	12
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

DATA PLATES

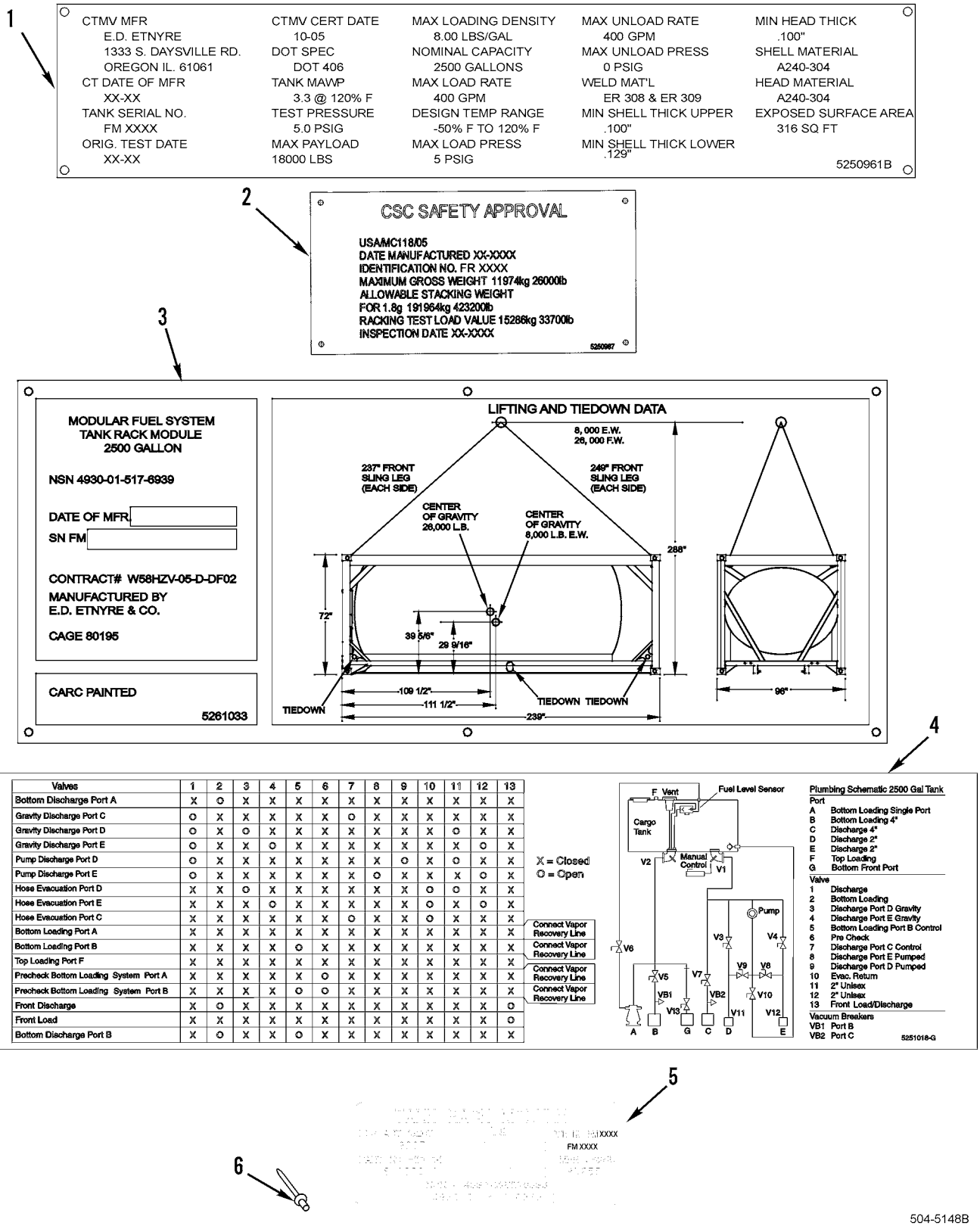


Figure 11. Data Plates.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0110	
					FIG. 11 DATA PLATES	
1	PAFZZ		80195	5250961	PLATE,IDENTIFICATION	1
2	PAFZZ		80195	5250987	DATA PLATE SAFETY	1
3	PAFZZ		80195	5251055	DATA PLATE TIE DOWN	1
4	PAFZZ		80195	5251018	DATA PLATE,OPERATING INST	1
5	PAFZZ		98255	810126	PLATE,IDENTIFICATION	1
6	PAFZZ		39428	97525A615	RIVET,POP	24
					END OF FIGURE	

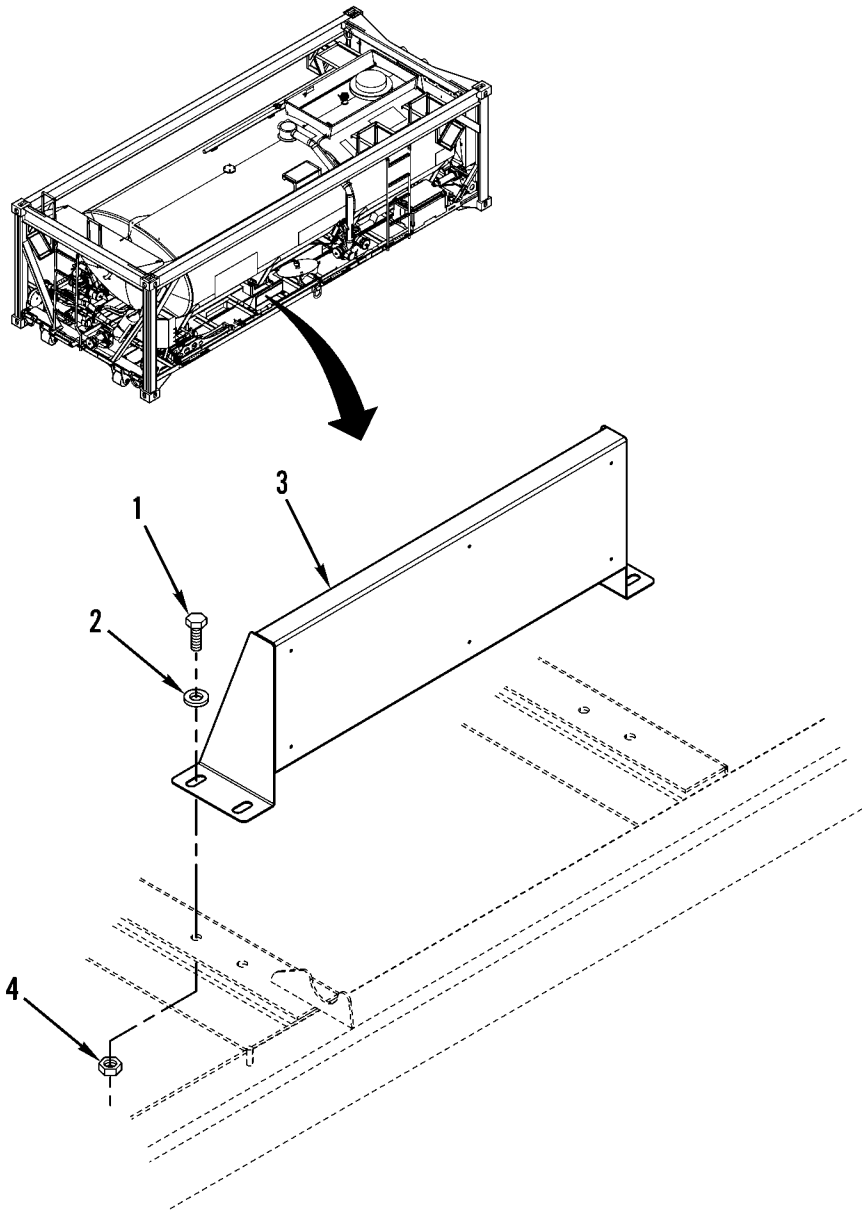


Figure 12. Data Plate Bracket.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0110	
					FIG. 12 DATA PLATE BRACKET	
1	PAFZZ	5305015048288	2V507	92865A622	SCREW,CAP,SOCKET HEAD	4
2	PAFZZ	5310010831540	80195	0120388	WASHER,FLAT	4
3	PAFZZ		80195	5252230	BRACKET	4
4	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	4
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

ROLLERS

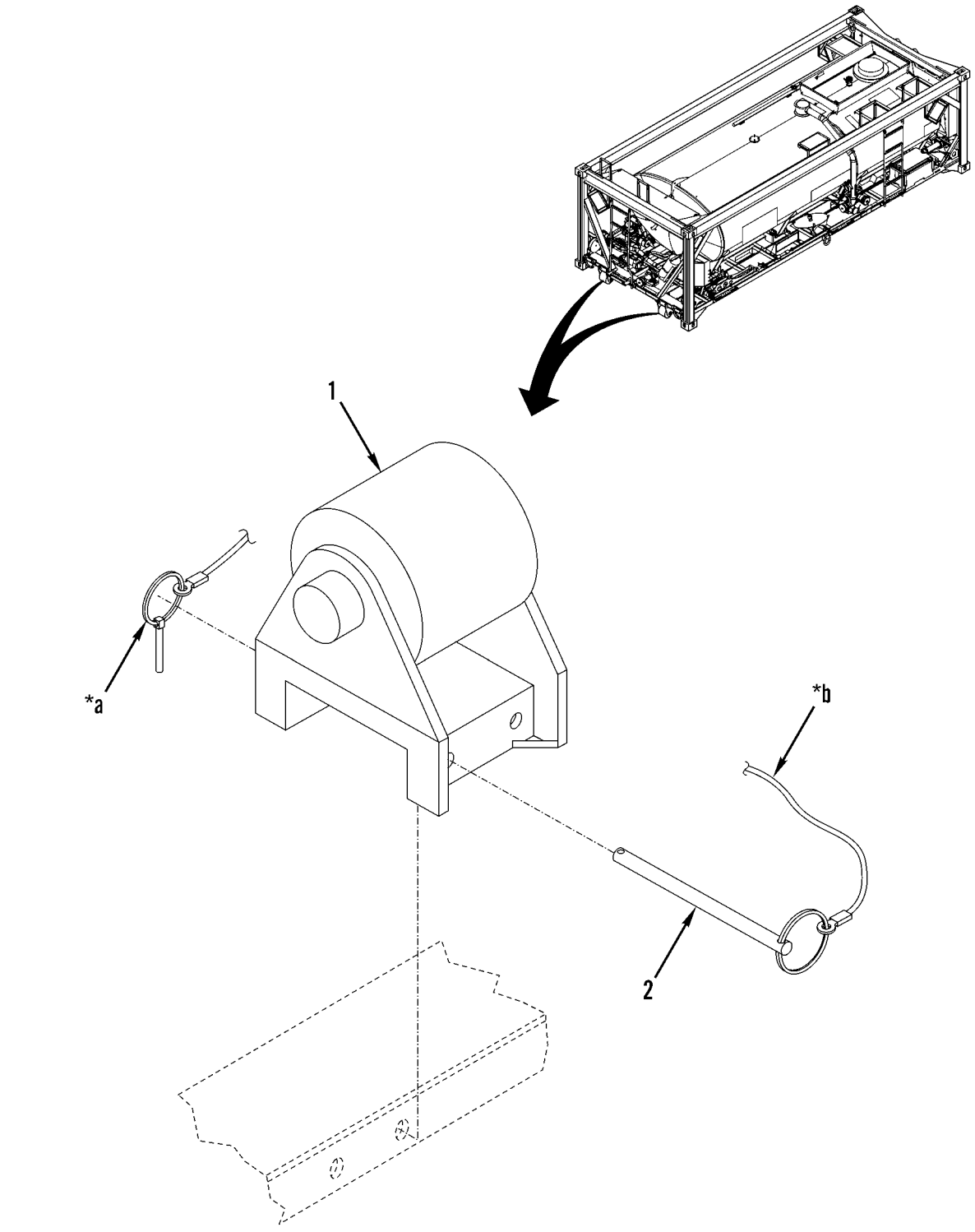


Figure 13. Rollers.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0111	
					FIG. 13 ROLLERS	
1	PAFZZ		80195	5250126	WHEEL SOLID METALLIC	2
2	PAFZZ		80195	5250118	PIN,STRAIGHT HEADLESS	4
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

FIRE EXTINGUISHER AND DRIP PAN BRACKETS

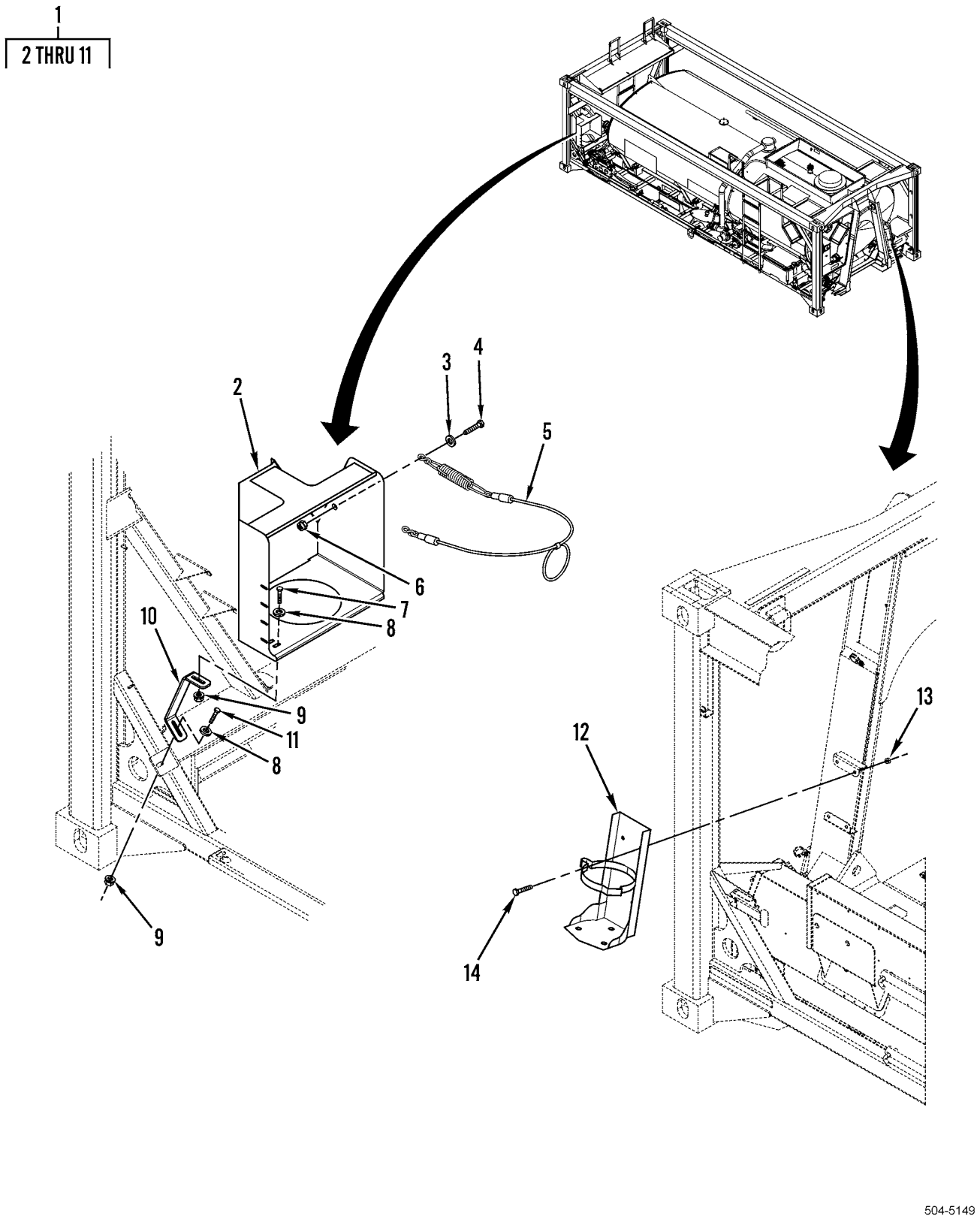


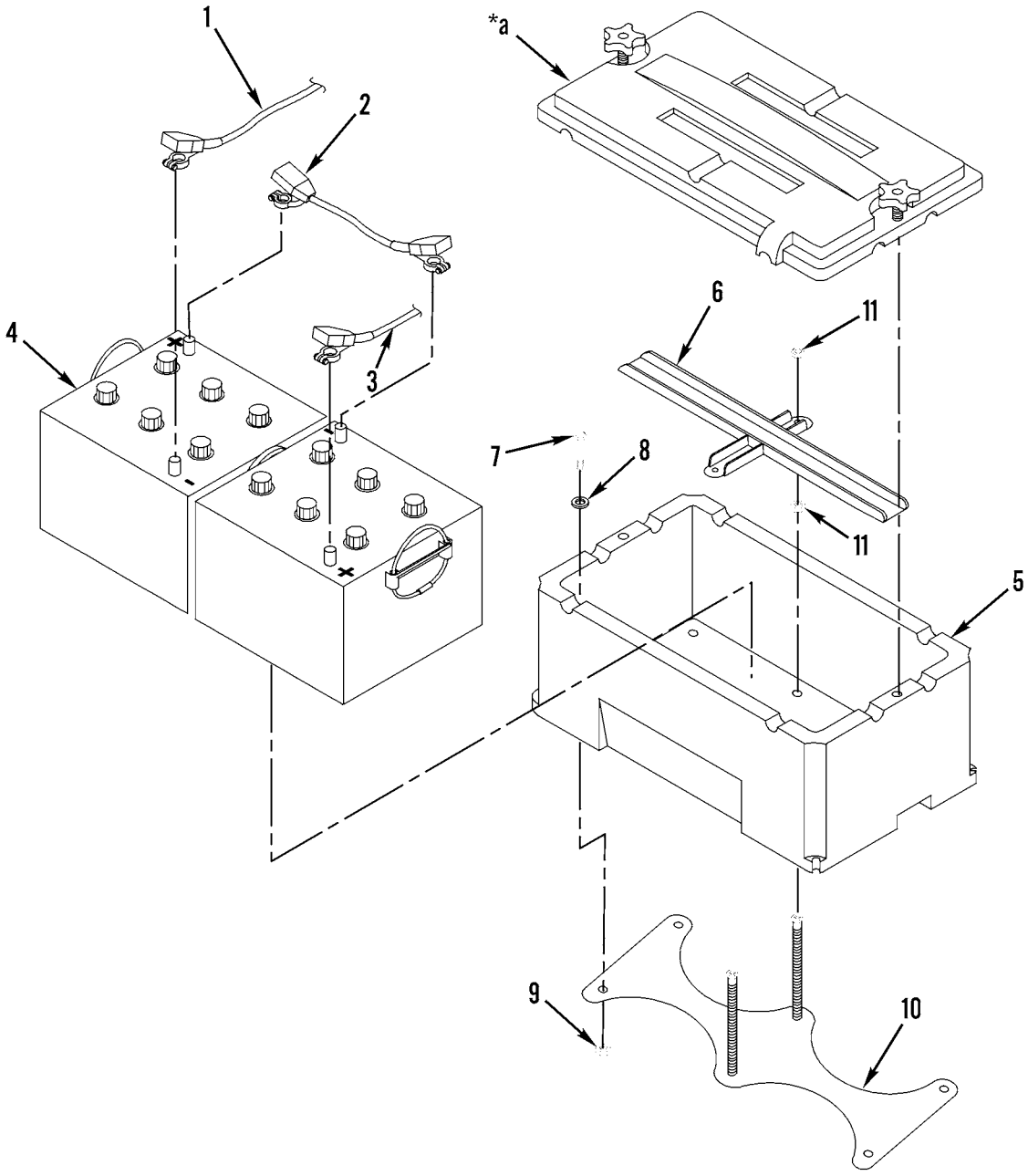
Figure 14. Fire Extinguisher and Drip Pan Brackets.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0112	
					FIG. 14 FIRE EXTINGUISHER AND DRIP PAN BRACKETS	
1	PAFFF		80195	5251703	DRIP PAN INSTALLATION	1
2	PAFZZ		80195	5251707	.MOUNT,DRIP PAN	1
3	PAFZZ	5310008238804	96906	MS27183-9	.WASHER,FLAT	1
4	PAFZZ		80195	0180037	.CAPSCREW	1
5	PAFZZ		80195	5251714	.TEATHER,CABLE	1
6	PAFZZ	5310000881251	81349	M45913/1-4CG5C	.NUT,SELF-LOCKING,HEXAGON	2
7	PAFZZ		80195	0180122	.CAPSCREW	2
8	PAFZZ	5310010831540	80195	0120388	.WASHER,FLAT	6
9	PAFZZ	5310009359021	96906	MS51943-35	.NUT,SELF-LOCKING,HEXAGON	3
10	PAFZZ		80195	5251712	.BRACE,DRIP PAN	1
11	PAFZZ	5305000680511	80204	B1821BH038C125N	.SCREW,CAP,HEXAGON HEAD	1
12	PAFZZ	4210011476483	03670	30937	BRACKET,FIRE EXTINGUISHER	2
13	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	8
14	PAFZZ	5305015175475	39428	92620A624	SCREW,CAP,HEXAGON HEAD	8
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

BATTERIES



*a PART OF ITEM 5

504-5150

Figure 15. Batteries.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0113	
					FIG. 15 BATTERIES	
1	PAFZZ		80195	6703609	CABLE,NATO,POSITIVE	1
2	PAFZZ		80195	6703608	CABLE,BATTERY	1
3	PAFZZ		80195	6703610	CABLE,NATO,NEGATIVE	1
4	PAFZZ	6140014469506	19207	6TMF/TYPEII	BATTERY,STORAGE	2
5	PAFZZ		80195	5251093	BATTERY BOX	1
6	PAFZZ		80195	5251249	UPPER HOLD BATTERY BOX	1
7	PAFZZ	5305000680511	80204	B1821BH038C125N	SCREW,CAP,HEXAGON HEAD	4
8	PAFZZ	5310010831540	80195	0120388	WASHER,FLAT	4
9	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	4
10	PAFZZ		80195	5251248	LOWER HOLD BATTERY BOX	1
11	PAFZZ	5310015339640	39428	91030A033	NUT,PLAIN,EXTENDED WASHER,HEXAGON .	4
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

BATTERY CHARGER

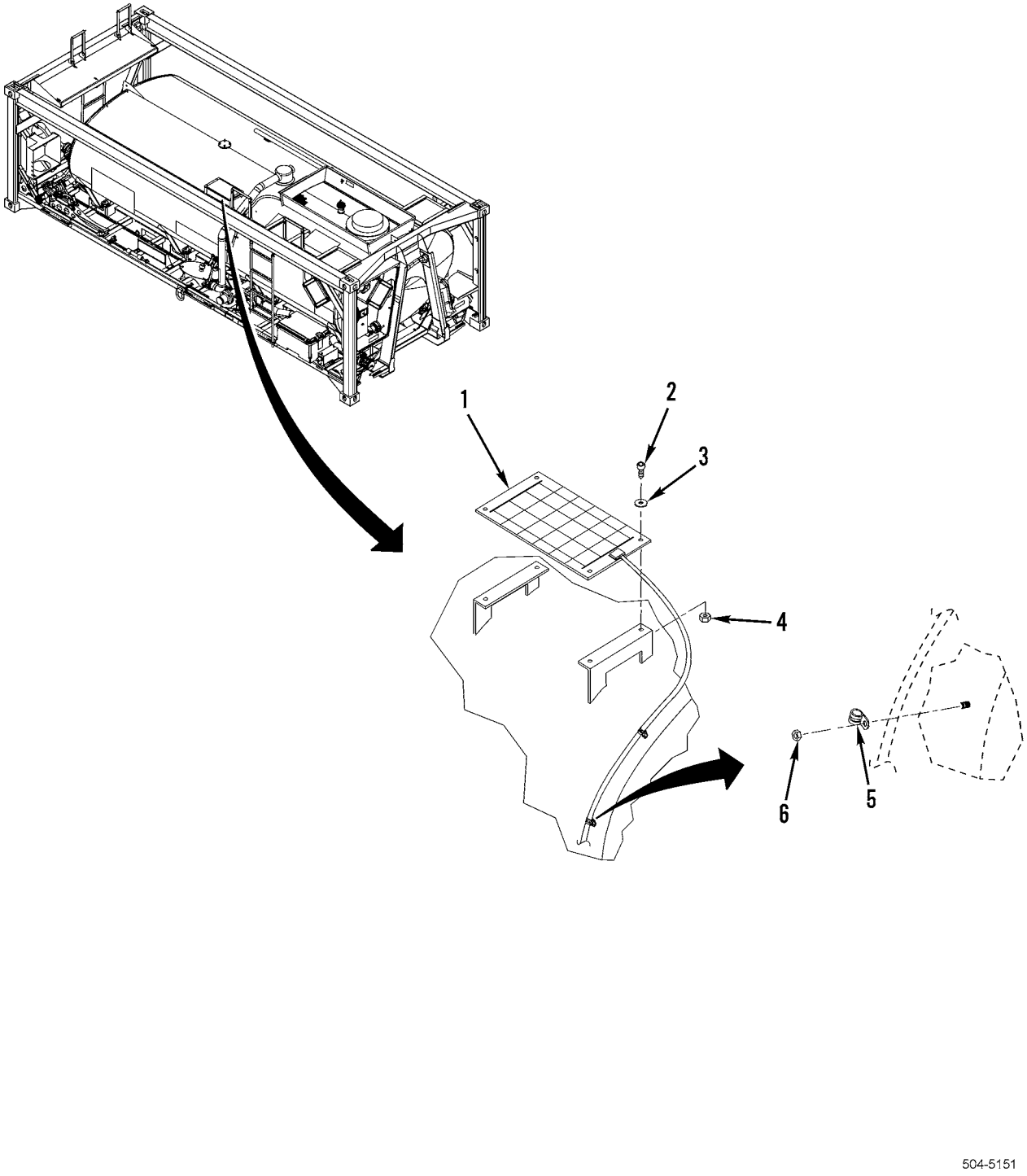


Figure 16. Battery Charger.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0114	
					FIG. 16 BATTERY CHARGER	
1	PAFZZ	6130014497594	09GZ5	VC-5	CHARGER,BATTERY	1
2	PAFZZ	5305015731548	07070	92196A245	SCREW,CAP,SOCKET HEAD	4
3	PAFZZ	5310015537188	39428	91100A170	WASHER,FLAT	4
4	PAFZZ		39428	90045A016	NUT,PLAIN,LOCKING	4
5	PAFZZ	5340015123422	39428	3225T24	CLAMP,LOOP	2
6	PAFZZ	5310000881251	81349	M45913/1-4CG5C	NUT,SELF-LOCKING,HEXAGON	2
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

NATO SLAVE CONNECTOR

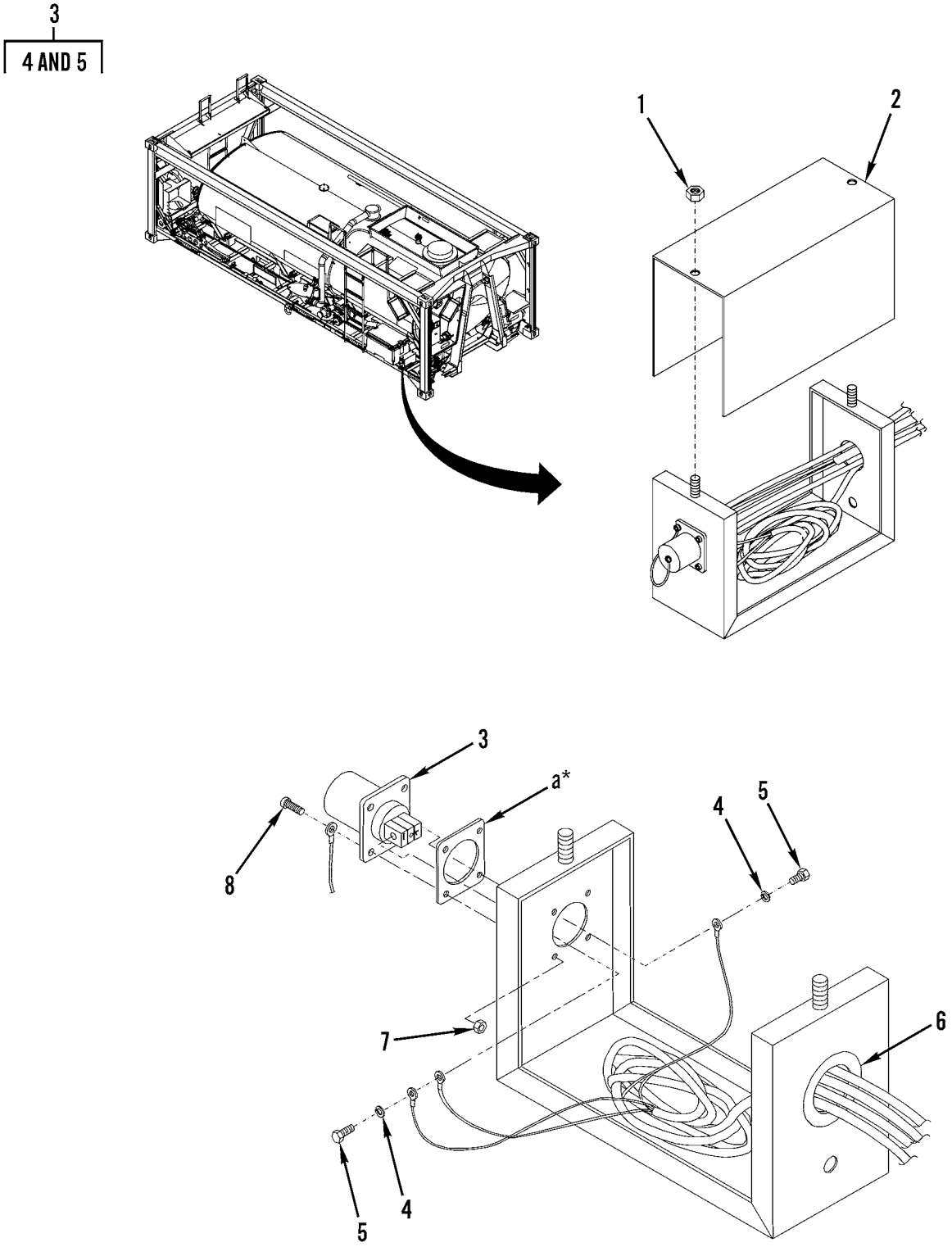


Figure 17. NATO Slave Connector.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0115	
					FIG. 17 NATO SLAVE CONNECTOR	
1	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	2
2	PAFZZ		80195	5250942	NATO LID, ENCLOSURE	1
3	PAFZZ	5935010979974	19207	11674728	CONNECTOR,RECEPTACLE,ELECTRICAL ...	1
4	PAFZZ	5310006379541	65035	P49866-11	.WASHER,LOCK	2
5	PAFZZ	5305015333680	39428	92620A621	.SCREW,CAP,HEXAGON HEAD	2
6	PCFZZ	5325014811738	4X630	863-000616	GROMMET,NONMETALLIC	1
7	PAFZZ		39428	90045A018	HEX,NUT	4
8	PAFZZ	5305015370631	2V507	91251A345	SCREW,CAP,SOCKET HEAD	4
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

TANK COVER PLATE

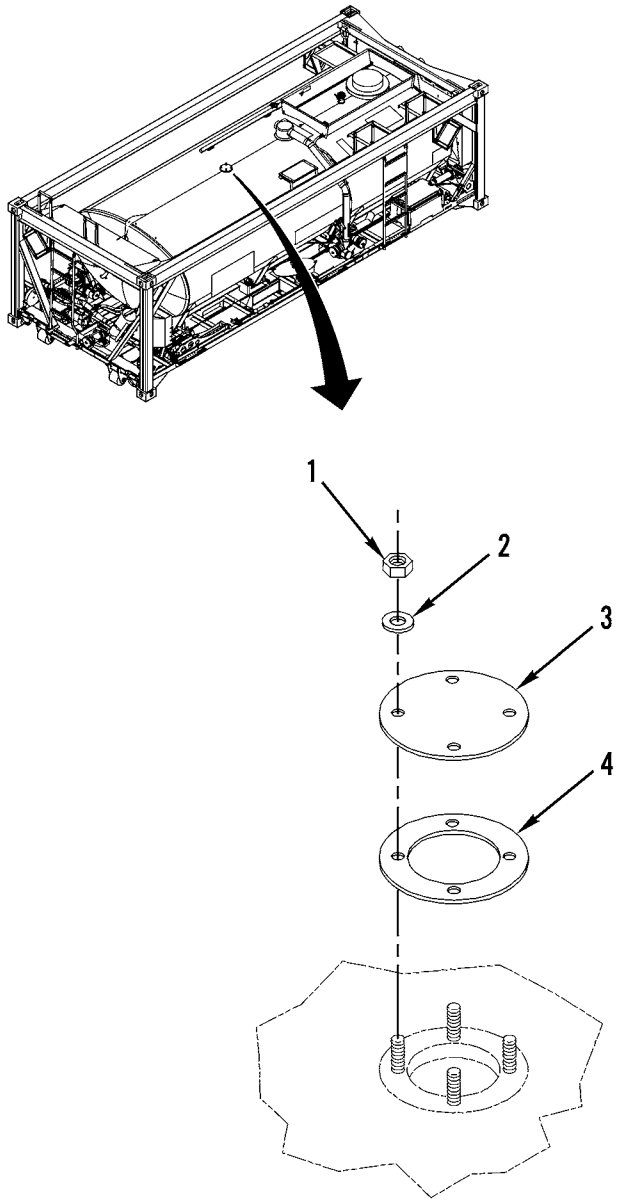


Figure 18. Tank Cover Plate.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 02	
					GROUP 0201	
					FIG. 18 TANK COVER PLATE	
1	PAFZZ		39428	90640A133	SELF LOCK,NUT,HEX	4
2	PAFZZ	5310013006397	96906	NAS620C6	WASHER,FLAT	4
3	PAFZZ		80195	5252227	PLATE-BLANK,TANK SHELL COVER	1
4	PCFZZ		39428	4459K75	.GASKET,NONASBESTOS	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

REAR HEAD TANK GAUGE

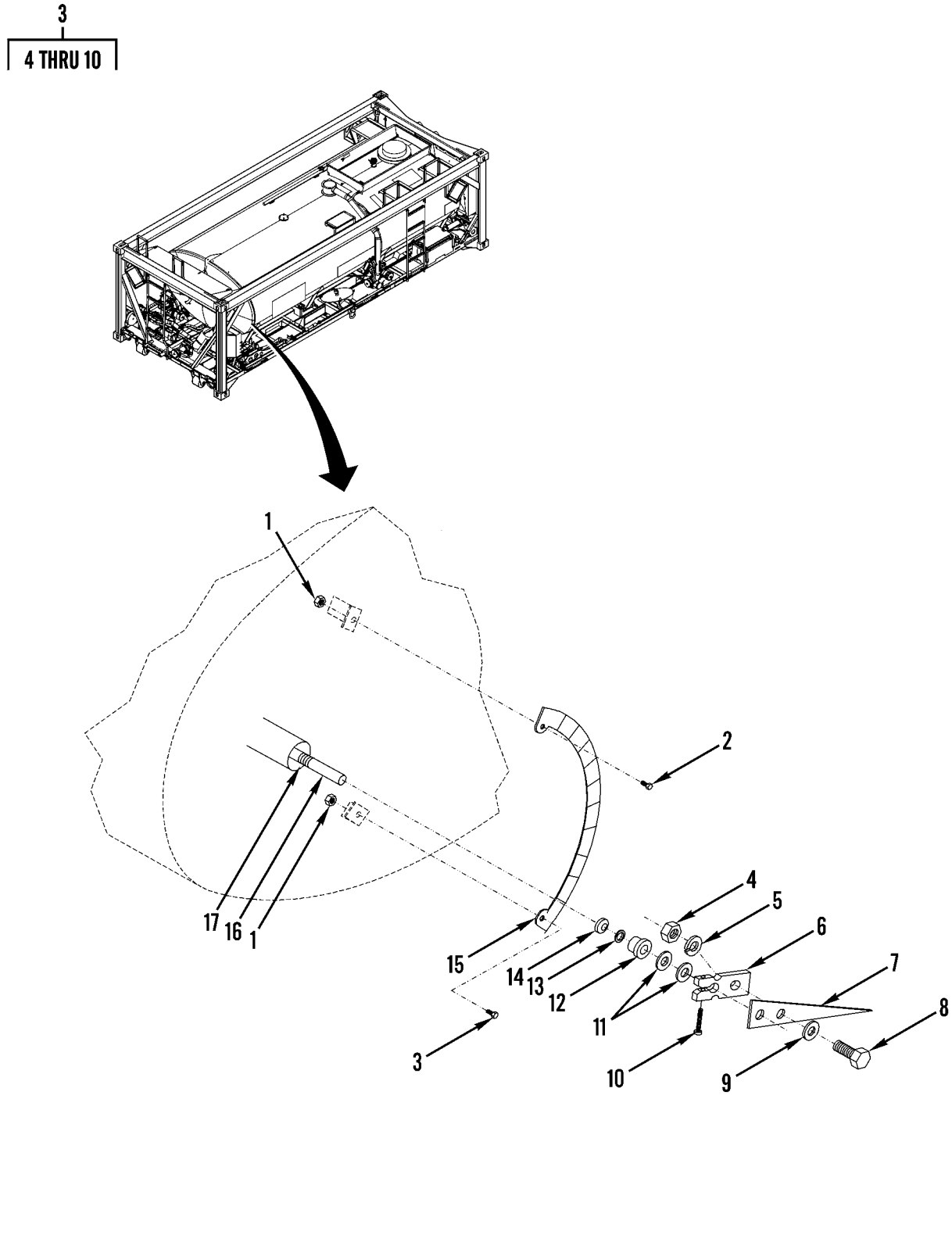


Figure 19. Rear Head Tank Gauge.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0202	
					FIG. 19 REAR HEAD TANK GAUGE	
1	PAHZZ		80195	6100388	LOCKNUT,HEX	2
2	PAFZZ		80195	6100666	SCREW	2
3	PAFZZ		80195	5251268	DIAL POINTER ASSY	1
4	PAFZZ	5310014664092	30554	88-22790-5	.NUT,PLAIN,HEXAGON	2
5	PAFZZ	5310002095116	96906	MS35335-37	.WASHER,LOCK	1
6	PAFZZ		80195	5251267	.CLAMP-TANK POINTER	1
7	PAFZZ		80195	5250424	.POINTER	1
8	PAFZZ		39428	92865A107	.CAP,SCREW 0.313X1	1
9	PAFZZ	5310015327068	39428	98026A030	.WASHER,FLAT	1
10	PAFZZ	5305011898437	39428	91251A583	.SCREW,CAP,SOCKET HEAD	1
11	PAFZZ		80195	6100440	WASHER,FLAT	2
12	PAFZZ		80195	5250426	STEM CAP	1
13	PCFZZ	5331001660980	81343	AS3209-012	O-RING	1
14	PCFZZ		80195	5251117	GASKET	1
15	PAFZZ		80195	5251121	GUAGE	1
16	PAHZZ		80195	5250992	STEM	1
17	PAHZZ		80195	5251107	SHAFT	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

FRONT AND REAR DRAIN LINES

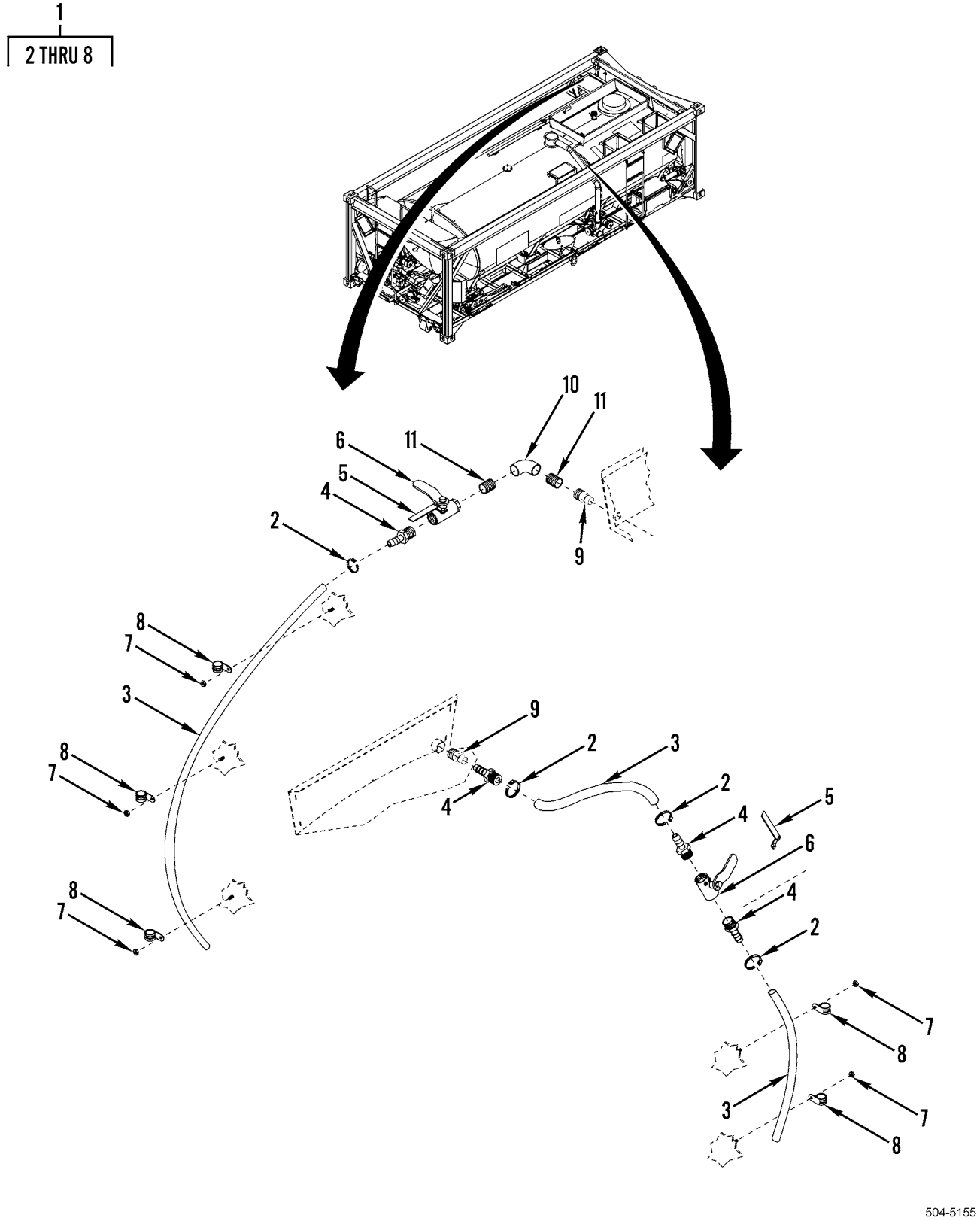


Figure 20. Front and Rear Drain Lines.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0203	
					FIG. 20 FRONT AND REAR DRAIN LINES	
1	AFFFF		80195	5250962	DRAIN INSTALLATION	2
2	PAFZZ		80195	6603080	.CLAMP	4
3	MFFZZ		80195	6603502-14.6	.HOSE,FUEL .75 FIT MAKE FROM P/N 6603502,CUT TO FIT 14.6 FT	3
4	PAFZZ		80195	6200941	.HOSE BARB	4
5	PAFZZ		80195	5251556	.VALVE SPILLBOX ID	2
6	PAFZZ		80195	6603073	.VALVE,BALL	2
7	PAFZZ	5310000881251	81349	M45913/1-4CG5C	.NUT,SELF-LOCKING,HEXAGON	5
8	PAFZZ	5340014813344	4X630	863-000313	.CLAMP,LOOP	5
9	PCFZZ		39428	4464K276	BUSHING	1
10	PAFZZ	4730013004090	39428	4464K15	ELBOW,PIPE	1
11	PAFZZ		39428	4561K14	NIPPLE,0.75NPT	2
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

VENT VALVE ASSEMBLY

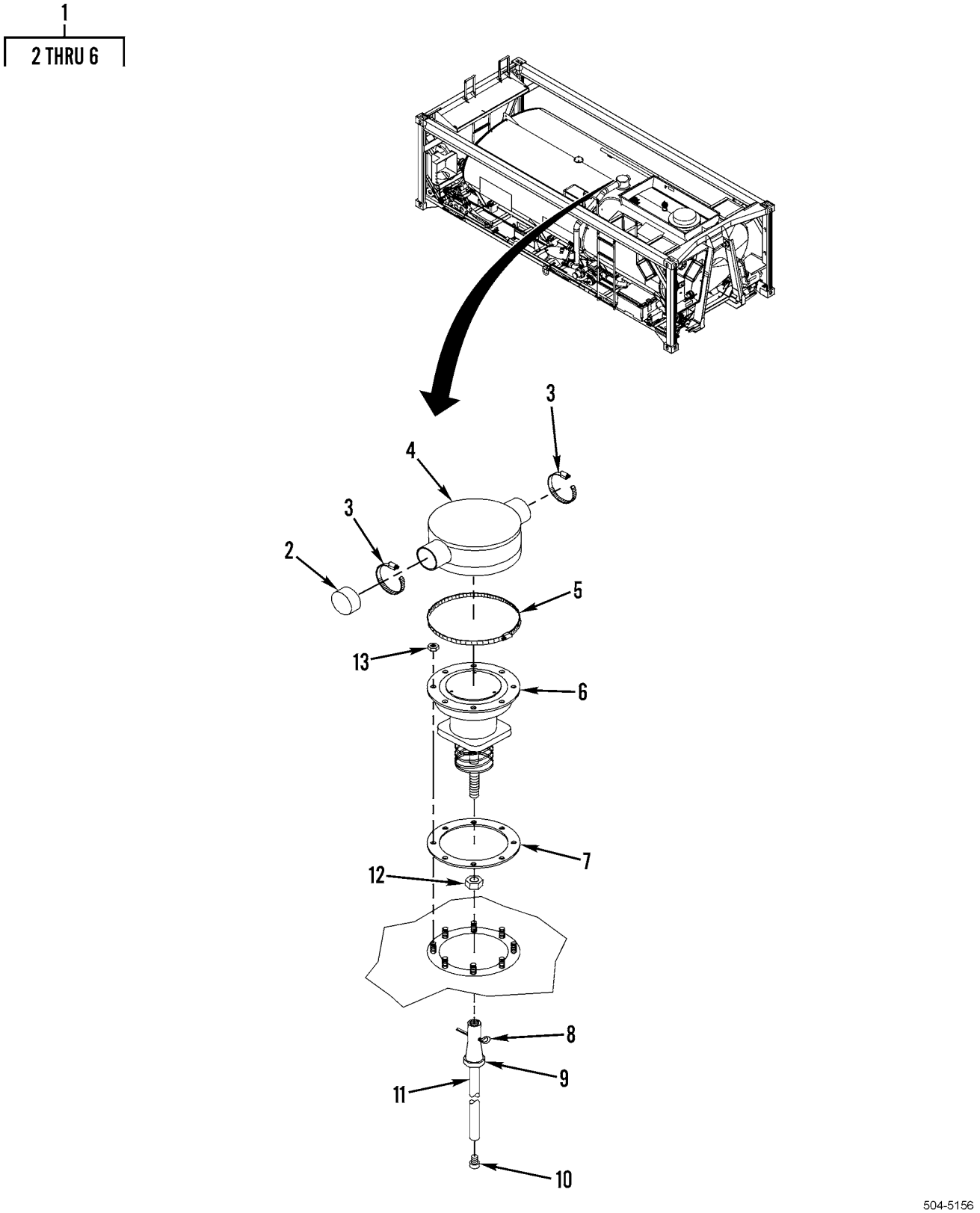


Figure 21. Vent Valve Assembly.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0204	
					FIG. 21 VENT VALVE ASSEMBLY	
1	PBFFF	4820011924496	79318	F646AD	VENT,VALVE,ASSEMBLY	1
2	PAFZZ	4730011589183	79318	2733418	.PLUG,PIPE	1
3	PAFZZ		39428	5011T67	.CLAMP	2
4	PAFZZ	4820011616372	79318	2731807-1	.HOOD,VENT,FUEL VALV	1
5	PAFZZ	5340015440294	3A054	5011T39	.CLAMP,LOOP	1
6	PAFZZ		79318	2734794-101	.BODY ASSEMBLY	1
7	PCFZZ	5330015356103	55242	10232E	GASKET	1
8	PAFZZ	5315000137214	80205	MS24665-359	PIN,COTTER	1
9	PAFZZ	4820012212093	79318	4052-4	SOCKET,VENT VALVE	1
10	PAFZZ	5340015617456	79318	4052-16-1	BUTTON,PLUG	1
11	PAFZZ	3040015722203	79318	4052-16	PUSHROD	1
12	PAFZZ	5310001535569	80205	AN316-9R	NUT,PLAIN,HEXAGON	1
13	PAFZZ	5310008348734	96906	MS35691-37	NUT,PLAIN,HEXAGON	8
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

VAPOR RECOVERY PIPING ASSEMBLY

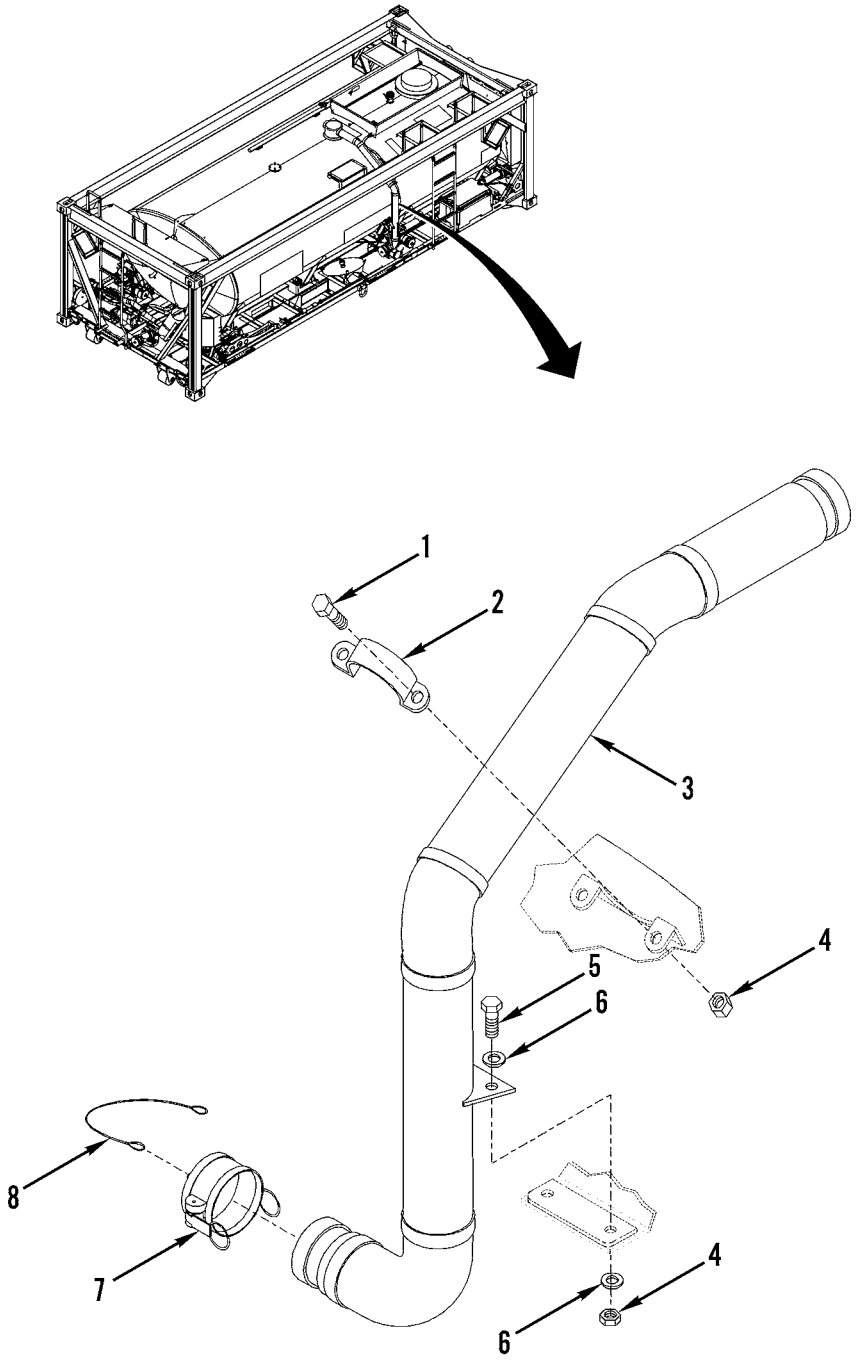


Figure 22. Vapor Recovery Piping Assembly.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0205	
					FIG. 22 VAPOR RECOVERY PIPING ASSEMBLY	
1	PAFZZ		39428	91309A626	SCREW,CAP HEX HD	2
2	PAFZZ		80195	5251189	TUBES STP 3" PIPE	1
3	PAFZZ		80195	5250870	VAPOR PIPING	1
4	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	4
5	PAFZZ		39428	91309A624	SCREW, CAP HEX HD	2
6	PAFZZ	5310000806004	96906	MS27183-14	WASHER,FLAT	4
7	PAFZZ	4730006406156	58536	AA59326IX-9	CAP,QUICK DISCONNECT	1
8	PAFZZ		39428	30345T5	LANYARD	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

LIQUID LEVEL SWITCH

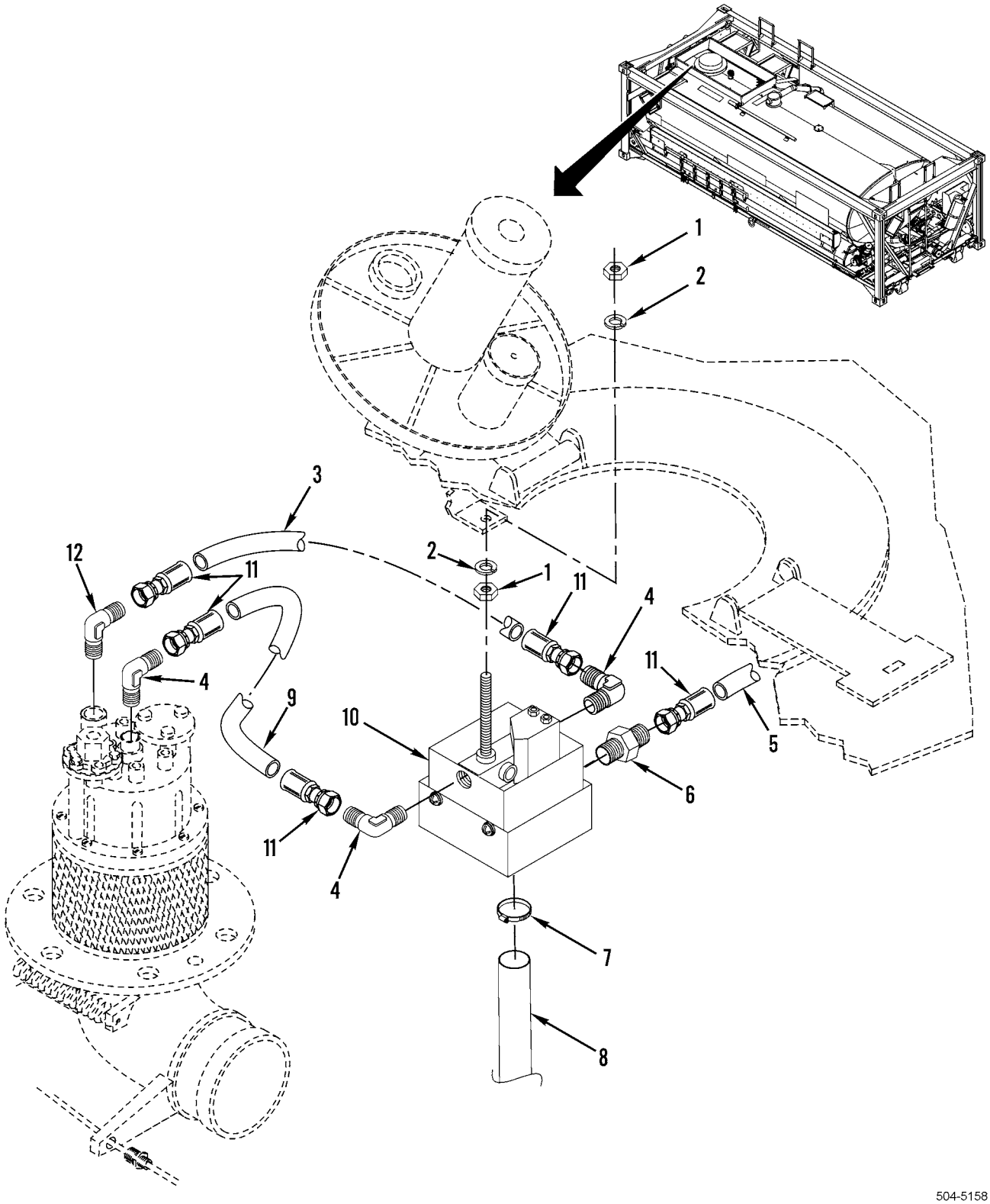


Figure 23. Liquid Level Switch.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0206	
					FIG. 23 LIQUID LEVEL SWITCH	
1	PAFZZ		80195	T181741	NUT,HEX	2
2	PAFZZ		80195	6100459	WASHER,LOCK	2
3	MFHZZ		80195	6602757-11	TUBE,NYLON 0.38 MAKE FROM P/N 6602757,CUT TO LENGTH,11 FT	1
4	PAFZZ		39428	5182K156	ELBOW	3
5	MFHZZ		80195	6309334-22	TUBE,NYLON MAKE FROM P/N 6309334, CUT TO LENGTH,22 FT	1
6	PAFZZ		39428	5182K119	ADAPTER	1
7	PAFZZ		3A054	54155K17	CLAMP,HOSE	1
8	MFHZZ		80195	6603136	HOSE	1
9	MFHZZ		80195	6602543-11	TUBE,NYLON 0.38 MAKE FROM P/N 6602543,CUT TO LENGTH,11 FT	1
10	PAFZZ	6680014549747	92003	F-613-ACD	CONTROL,RATE OF FLOW,LIQUID	1
11	PAFZZ		80195	6603289	ADAPTER,STRAIGHT	6
12	PAFZZ		80195	6603516	ELBOW	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

STOWAGE TUBE ASSEMBLY

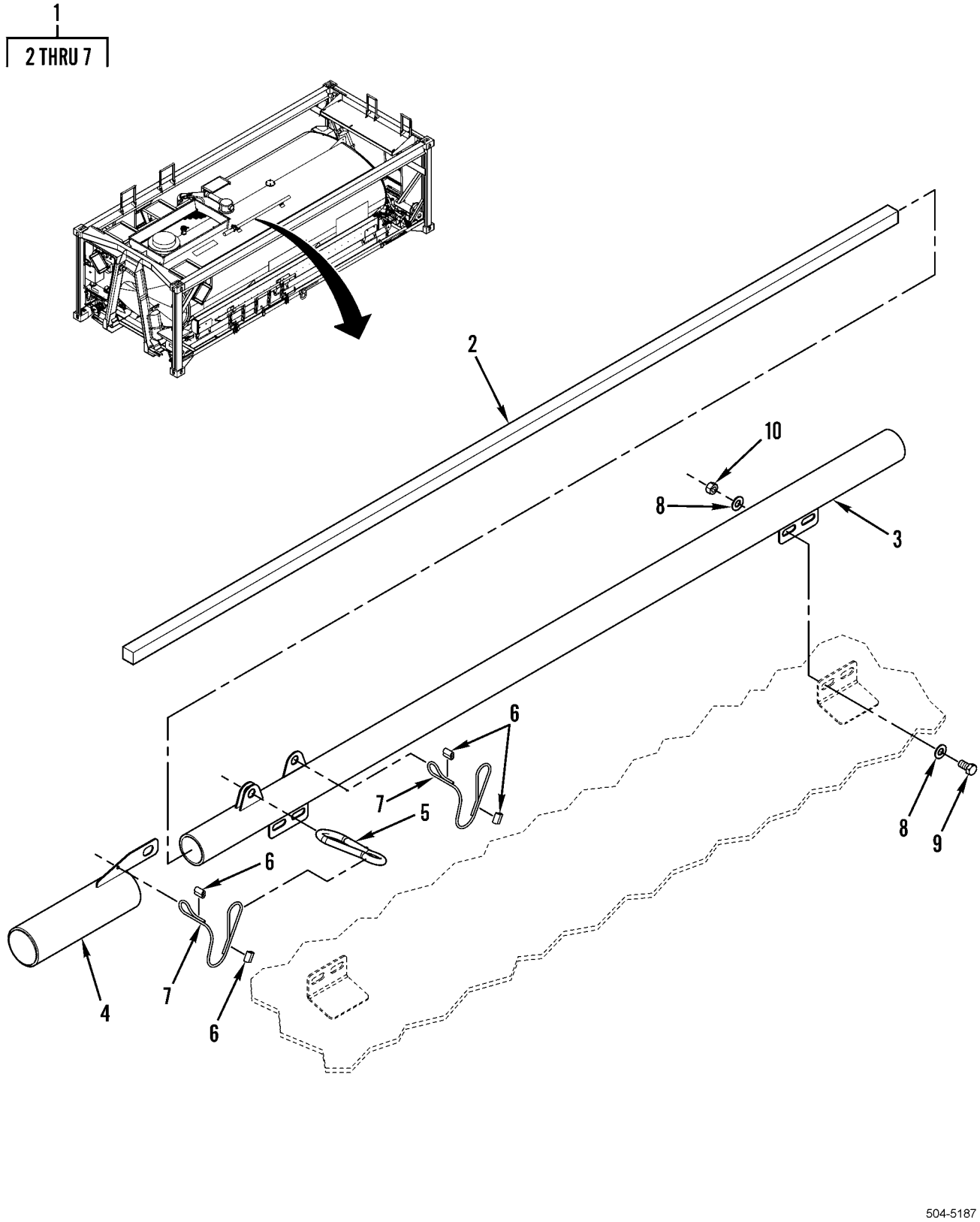


Figure 24. Stowage Tube Assembly.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0208	
					FIG. 24 STOWAGE TUBE ASSEMBLY	
1	PAFFF		80195	5252234	TUBE ASM-STOWAGE,GAUGE STICK	1
2	PAFZZ	6680015827535	80195	5252235	.GAUGE,STICK	1
3	PAFZZ		80195	5252236	.TUBE,STOWAGE,GAUGE STICK	1
4	PAFZZ		80195	5252240	.COVER	1
5	PAFZZ		39428	3079T44	.CLIP,SPRING SNAP	1
6	PAFZZ		39428	3883T43	.SLEEVE	4
7	MFFZZ		39428	3458T17-16	.WIRE,ROPE 16” MAKE FROM P/N 3458T17	2
8	PAFZZ	5310010831540	80195	0120388	WASHER,FLAT	8
9	PAFZZ	5305015048288	2V507	92865A622	SCREW,CAP,SOCKET HEAD	4
10	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	4
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

DISCHARGE PIPING ASSEMBLY

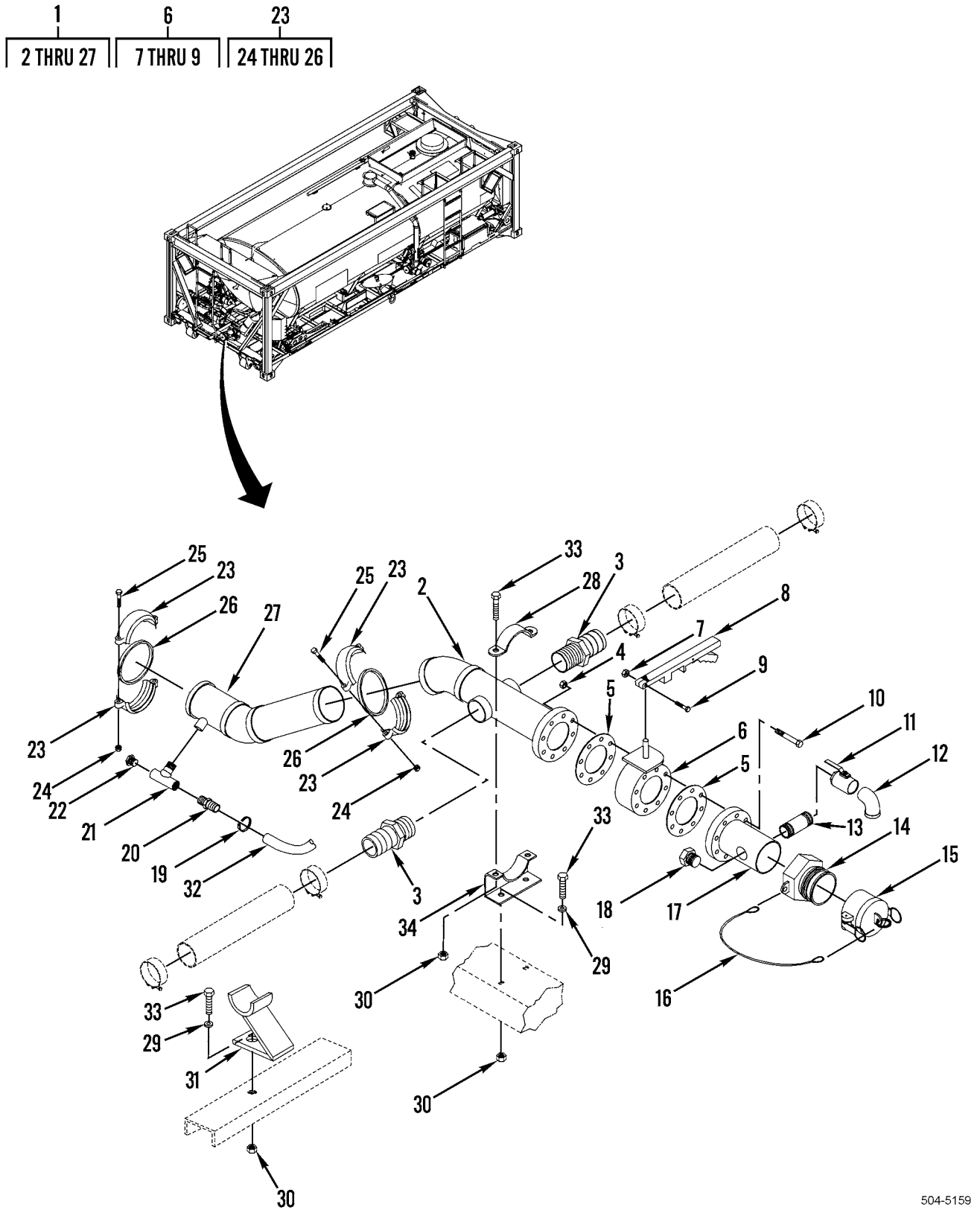


Figure 25. Discharge Piping Assembly.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 03	
					GROUP 0300	
					FIG. 25 DISCHARGE PIPING ASSEMBLY	
1	PAFFF		80195	5251317	DISCH PIPING ASM	1
2	PBFZZ		80195	5251140	.PIPE	1
3	PAFZZ		1G3R1	HB200SS	.APT,STGHT,PIPE	2
4	PAFZZ	5310009359021	96906	MS51943-35	.NUT,SELF-LOCKING,HEXAGON	8
5	PCFZZ		13266	10233C	.GASKET	2
6	PAFFF		13226	WD404AL	.BUTTERFLY VALVE	1
7	PAFZZ	5310008807744	49181	36103	..NUT,PLAIN,HEXAGON	1
8	PAFZZ	5340015047309	13226	26284AL	..LEVER,MANUAL CONTROL	1
9	PAFZZ	5305015047427	13226	9Q5884	..SCREW,CAP,HEXAGON HEAD	1
10	PAFZZ	5305002693211	80205	MS90725-60	.SCREW,CAP,HEXAGON HEAD	8
11	PAFZZ	4820011195389	57661	76-102-01	.VALVE,BALL	1
12	PAFZZ		39428	4464K37	.ELBOW,PIPE 0.375	1
13	PAFZZ		80195	6200974	.NIPPLE,PIPE	1
14	PAFZZ		80195	6000855	.ADAPTER CAM MAL	1
15	PAFZZ	4730006406156	58536	AA59326IX-9	.CAP,QUICK DISCONNECT	1
16	PAFZZ		39428	30345T5	.LANYARD	1
17	PAFZZ		80195	5250882	.PIPE	1
18	PAFZZ		80195	6200978	.PLUG	1
19	PAFZZ	4730009083193	58536	A-A-52506-F-24	.CLAMP,HOSE	2
20	PAFZZ		80195	6200971	.HOSE BARB-1.0	2
21	PAFZZ	4730013470810	39428	4464K53	.TEE,PIPE	1
22	PAFZZ		80195	L238039	.PLUG-PIPE SQ HD	1
23	PAFZZ		3HMC9	20361	.COUPLING, 4 IN.MARK	2
24	PAFZZ	5310000881251	81349	M45913/1-4CG5C	..NUT,SELF-LOCKING,HEXAGON	4
25	PAFZZ		39428	91309A626	..SCREW,CAP HEX HD	4
26	PCFZZ		79154	1-1/4 IN77/75/78T	..SLIDE GASKET	2
27	PAFZZ		80195	5251314	.PIPE-DISCH ASSY	1
28	PAFZZ		80195	5250890	STRAP	1
29	PAFZZ	5310008238804	96906	MS27183-9	WASHER,FLAT	4
30	PAFZZ		39428	91837A030	NUT,HEX	2
31	PAFZZ		80195	5251697	BRACKET PUMP 2" HOSE	1
32	MFFZZ		73002	B716-X	FUEL HOSE 1" 7' MAKE FROM P/N B716,CUT TO LENGTH	1
33	PAFZZ	5306002264825	80204	B1831BH031C075N	BOLT,MACHINE	2
34	PBFZZ		80195	5251085	BRACKET	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

LEFT HAND OR RIGHT HAND DISCHARGE ARM

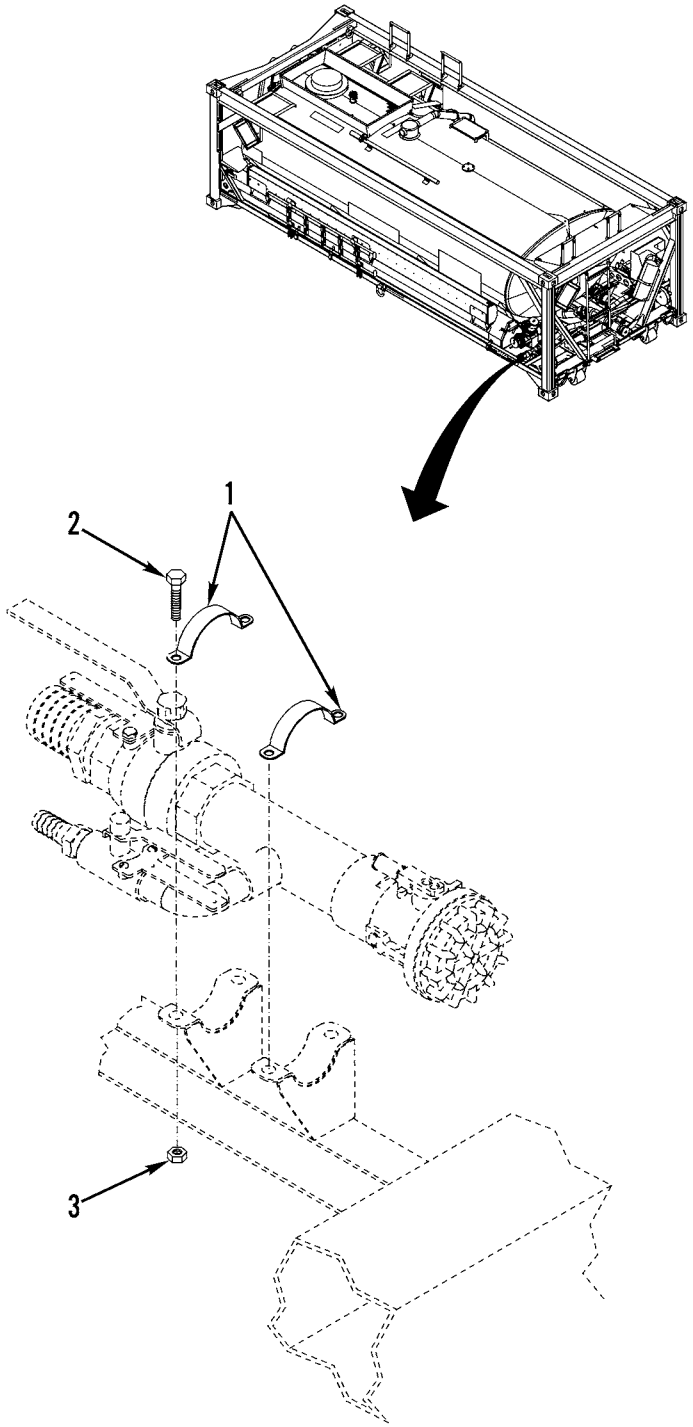


Figure 26. Left Hand or Right Hand Discharge Arm (Sheet 1 of 3).

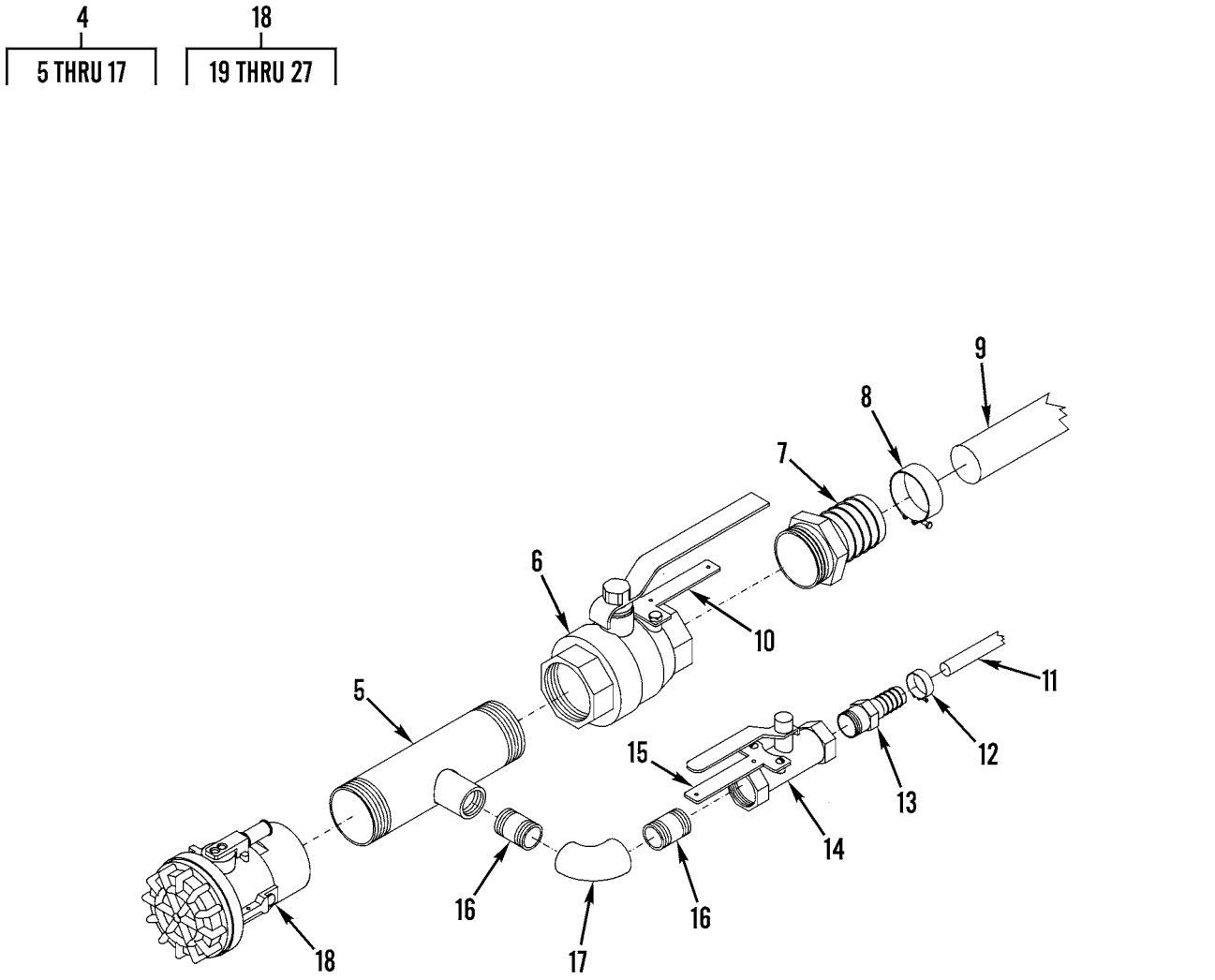


Figure 26. Left Hand or Right Hand Discharge Arm (Sheet 2 of 3).

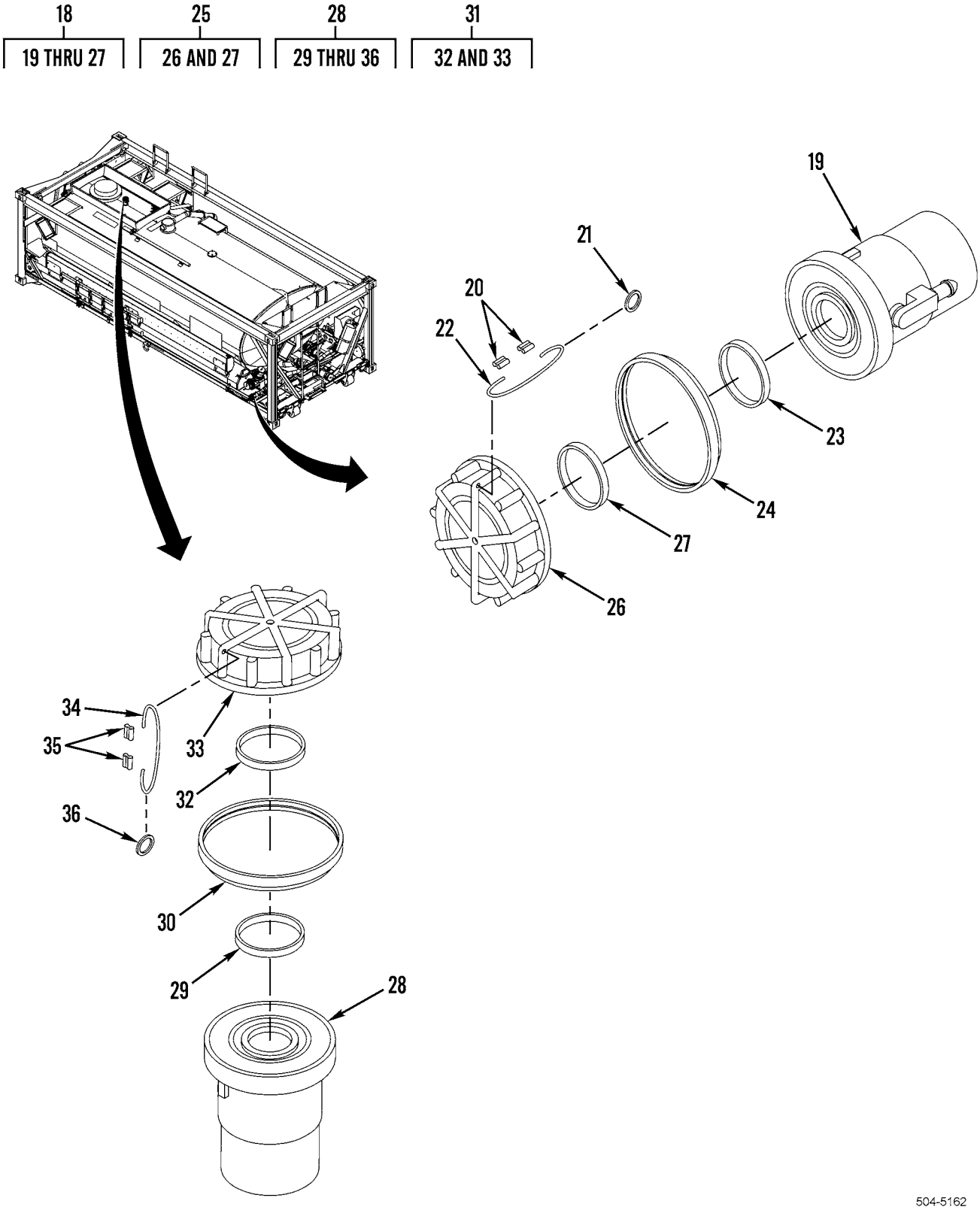


Figure 26. Left Hand or Right Hand Discharge Arm (Sheet 3 of 3).

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0303	
					FIG. 26 LEFT HAND OR RIGHT HAND DISCHARGE ARM	
1	PBFZZ		80195	5250929	CLAMP	2
2	PAFZZ		39428	91309A626	SCREW,CAP HEX HD	4
3	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	4
4	PAFFF		80195	5251318	DISCHARGE ARM	1
5	PBFZZ		80195	5251320	.TUBE-DISCHARGE 2"	1
6	PBFZZ		1G3R1	VSS200S	.2" VALVE BALL	1
7	PAFZZ		1G3R1	HB200SS	.APT,STGHT,PIPE	1
8	PAFZZ		3A054	54155K17	.CLAMP,HOSE	4
9	MFFZZ		8754	543-738-X	.HOSE, 2 IN JET FUEL	1
10	PAFZZ		80195	5251559	.V3 DIS VALVE ASM	1
11	MFFZZ		73002	B716	.FUEL HOSE 1" 7' MAKE FROM P/N B716,CUT TO LENGTH	1
12	PAFZZ	4730009083193	58536	A-A-52506-F-24	.CLAMP,HOSE	4
13	PAFZZ		1G3R1	HB100SS	.HOSE BARB 1.0	1
14	PAFZZ		80195	6603579	.BALL VALVE 1" SS	1
15	PAFZZ		80195	5251560	.V9 DIS VALVE ASM	1
16	PAFZZ	4730009750324	39428	4830K221	.NIPPLE,PIPE	2
17	PAFZZ		39428	4464K16	.ELBOW,PIPE LH	1
17	PAFZZ		80195	6603088	.ELBOW,PIPE RH	1
18	PAFZZ	4730012595838	00624	AE82096R	COUPLING HALF,QUICK DISCONNECT	1
19	PAFFF	4820014753173	0DT23	47031-1	.BODY,VALVE	1
20	PAFZZ	4030004315537	0DT23	28-2-G	.SWAGING SLEEVE,WIRE ROPE	2
21	PAFZZ	5365014905797	0DT23	220482	.RING,CONNECTING,ROUND	1
22	PAFZZ	4010015436609	0DT23	82499-1800	.ROPE,WIRE	1
23	PCFZZ	5330014339203	0DT23	220146	.SEAL,PLAIN	1
24	PCFZZ	2510014567850	0DT23	220161	.CAP,BUMPER	1
25	PAFFF	2910014562273	0DT23	47062	.CAP DUST	1
26	PAFZZ	4730015439501	0DT23	220162	..CAP,QUICK DISCONNECT	1
27	PCFZZ	5330014339203	0DT23	220146	..SEAL,PLAIN	1
28	PAFFF		0DT23	64019H	UNISEX ASSEMBLY	1
29	PCFZZ	5330014339203	0DT23	220146	.SEAL,PLAIN	1
30	PCFZZ	2510014567850	0DT23	220161	.CAP,BUMPER	1
31	PAFFF	2910014562273	0DT23	47062	.CAP DUST	1
32	PCFZZ	5330014339203	0DT23	220146	..SEAL,PLAIN	1
33	PAFZZ	4730015439501	0DT23	220162	..CAP,QUICK DISCONNECT	1
34	PAFZZ	4010015436609	0DT23	82499-1800	.ROPE,WIRE	1
35	PAFZZ	4030004315537	0DT23	28-2-G	.SWAGING SLEEVE,WIRE ROPE	2
36	PAFZZ	5365014905797	0DT23	220482	.RING,CONNECTING,ROUND	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

FUEL PUMP ASSEMBLY

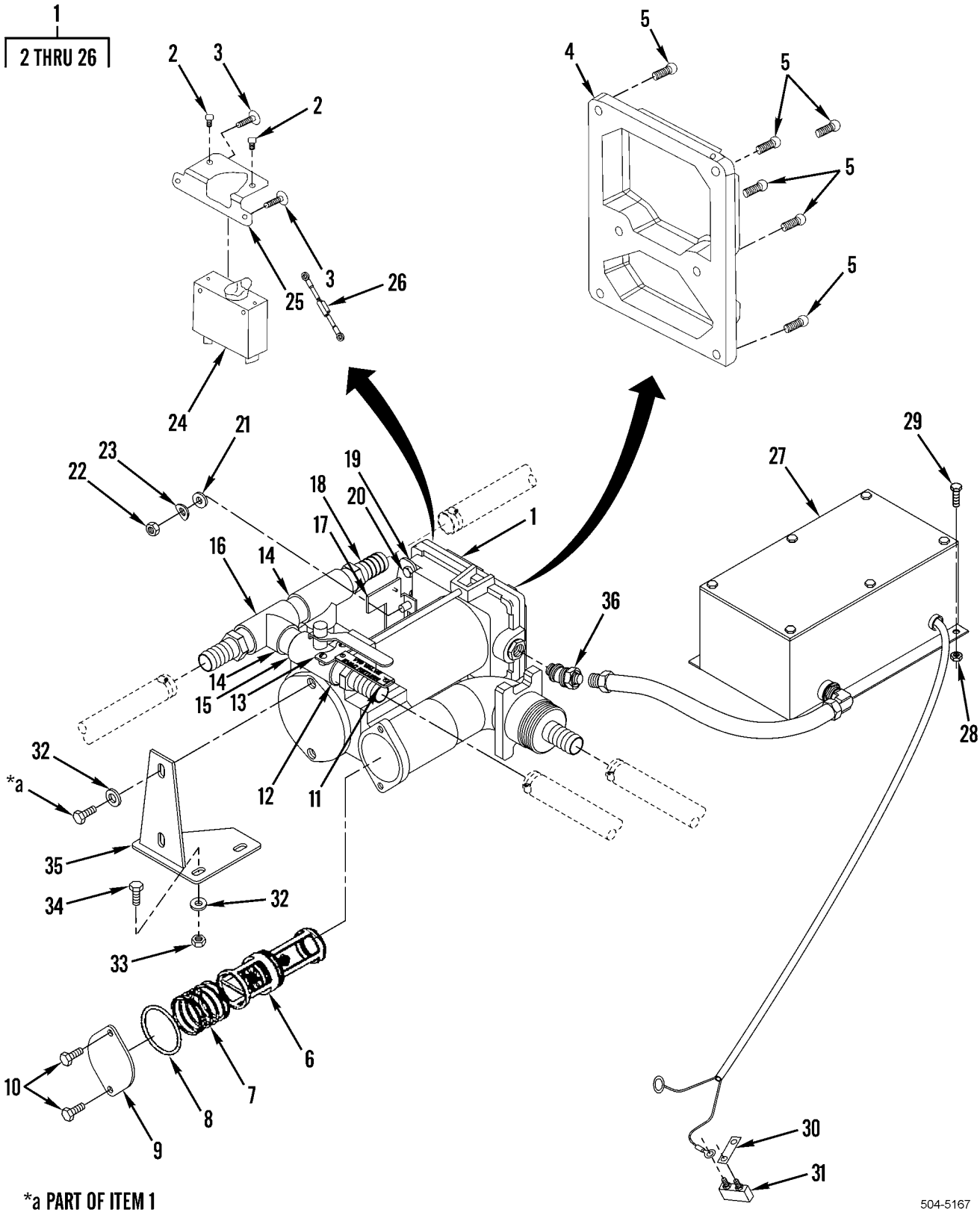


Figure 27. Fuel Pump Assembly.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 0304	
					FIG. 27 FUEL PUMP ASSEMBLY	
1	PAFZZ		80195	5251739	ELEC. PUMP 24V	1
2	PAFZZ		0J8Y6	904005-56	.SCREW	2
3	PAFZZ		0J8Y6	904002-25	.SCREW	2
4	PAFZZ		0J8Y6	133076-02	.CONDUIT BOX COVER	1
5	PAFZZ		0J8Y6	904006-60	.SCREW	6
6	PAFZZ		0J8Y6	5251740	.FILTER	1
7	PAFZZ		0J8Y6	121019-1	.SPRING	1
8	PCFZZ		0J8Y6	901001-90	.O-RING	1
9	PAFZZ		0J8Y6	133033-1	.COVER,FILTER	1
10	PAFZZ		0J8Y6	904001-37	.BOLT,MACHINE	2
11	PAFZZ	5320012713318	39428	97525A415	.RIVET,BLIND	2
12	PBFZZ		80195	5251323	.FLANGE-PUMP TRANS	1
13	PAFZZ		80195	5251562	.V-10 VALVE ID	1
14	PAFZZ	4730009750324	39428	4830K221	.NIPPLE,PIPE	3
15	PAFZZ		80195	6603579	.BALL VALVE	1
16	PAFZZ	4730013470810	39428	4464K53	.TEE,PIPE	2
17	PAFZZ		80195	5251381	.DATA PLATE	1
18	PAFZZ		1G3R1	HB100SS	.HOSE BARB 1.0	4
19	PBFZZ		80195	5251324	.BRACKET-PUMP INLET	1
20	PAFZZ		39428	91309A626	.SCREW,CAP HEX HD	2
21	PAFZZ		59585	904006-16	.WASHER,FLAT	1
22	PAFZZ		59585	904004-59	.NUT,SELF-LOCKING,HEXAGON	1
23	PAFZZ		59585	904006-63	.WASHER,SPRING	1
24	PAFZZ		0J8Y6	902006-60	.SWITCH/MOTOR PROT ECTOR	1
25	PAFZZ		0J8Y6	133078-1	.SWITCH MOUNT BRACKET	1
26	PAFZZ		80195	5251403	.CAPACITOR ASSEMBLY	1
27	PAFZZ		80195	5252268	CABLE/EMI BOX ASSEMBLY	1
28	PAFZZ	5310000881251	81349	M45913/1-4CG5C	NUT,SELF-LOCKING,HEXAGON	4
29	PAFZZ		80195	0180020	SCREW	4
30	PAFZZ		80195	3370314	TAB-MOUNTING,BREAKER	1
31	PAFZZ		13445	30407-50	CIRCUIT BREAKER	1
32	PAFZZ	5310010831540	80195	0120388	WASHER,FLAT	4
33	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	4
34	PAFZZ		80195	0120233	SCREW, HEX HEAD	4
35	PAFZZ		80195	5251692	BRACKET	1
36	PAFZZ	5975002245106	03743	ST4538	BOX CONNECTOR,ELECTRICAL	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

BOTTOM LOAD VALVE PIPING ASSEMBLY

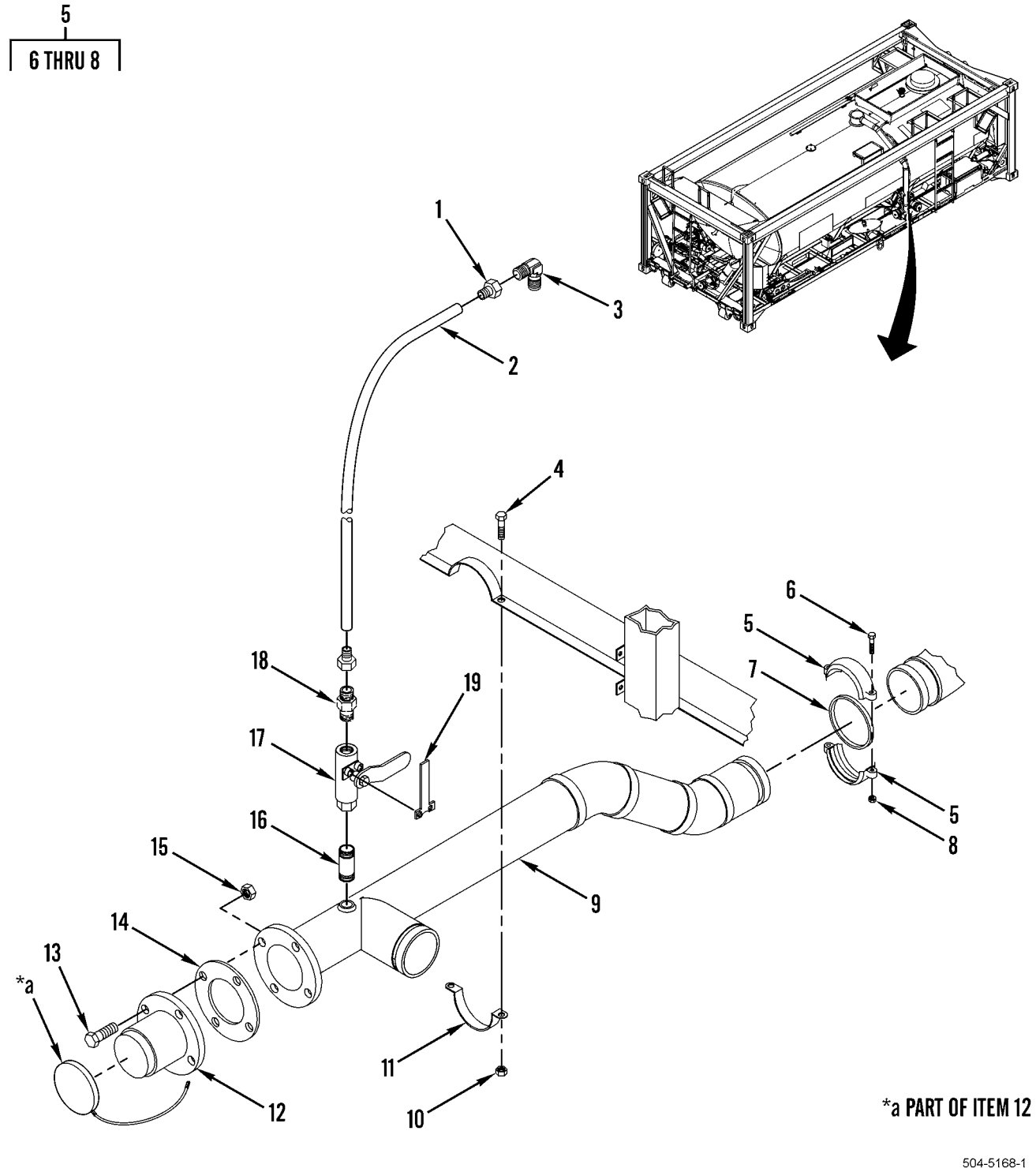


Figure 28. Bottom Load Valve Piping Assembly (Sheet 1 of 2).

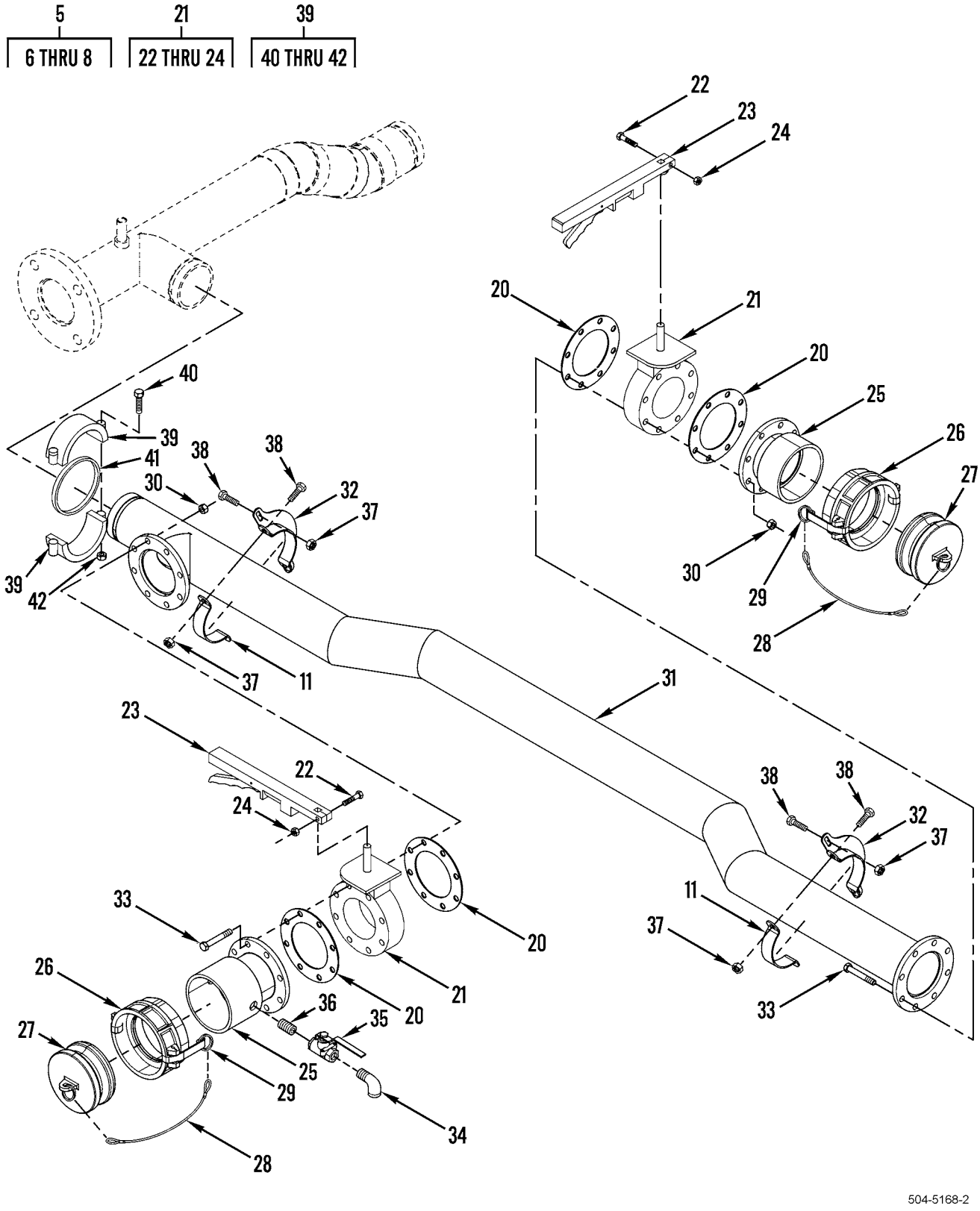


Figure 28. Bottom Load Valve Piping Assembly (Sheet 2 of 2).

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 04	
					FIG. 28 BOTTOM LOAD VALVE PIPING ASSEMBLY	
1	PAFZZ		80195	6603289	ADAPTER,STRAIGHT	1
2	MFFZZ		80195	6309334	TUBE MAKE FROM P/N 6309334,CUT TO FIT	1
3	PAFZZ		80195	6603288	ELBOW	1
4	PAFZZ		39428	91309A626	SCREW,CAP HEX HD	6
5	PAFZZ		3HMC9	20361	COUPLING	1
6	PAFZZ		39428	91309A626	.SCREW	2
7	PCFZZ		79154	1-1/4 IN77/75/78T	.SLIDE GASKET	1
8	PAFZZ	5310000881251	81349	M45913/1-4CG5C	.NUT,SELF-LOCKING,HEXAGON	2
9	PBFZZ		80195	5250877	PIPING	1
10	PAFZZ	5310000881251	81349	M45913/1-4CG5C	NUT,SELF-LOCKING,HEXAGON	2
11	PAFZZ		80195	5250885	STRAP	1
12	PAFZZ	4730001150452	79318	F417	COUPLING HALF,QUICK DISCONNECT	1
13	PAFZZ		39428	91251A351	SCREW	4
14	PCFZZ		80195	6603097	GASKET	1
15	PAFZZ		80195	9413569	NUT,HEX,LOCKING	4
16	PAFZZ		80195	6603289	ADAPTER	1
17	PAFZZ	4820011195389	57661	76-102-01	VALVE,BALL	2
18	PAFZZ	4730004193016	39428	4830K151	NIPPLE,PIPE	1
19	PAFZZ		80195	5251563	V-6 PRECHECK VALVE	1
20	PCFZZ	5330015668357	80195	6000071	GASKET	4
21	PAFZZ		13226	WD404 AL V	VALVE	1
22	PAFZZ	5305015047427	13226	9Q5884	.SCREW,CAP,HEXAGON HEAD	1
23	PAFZZ	5340015047309	13326	26284AL	.LEVER,MANUAL CONTROL	1
24	PAFZZ	5310007680318	96906	MS51967-14	.NUT,PLAIN,HEXAGON	1
25	PAFZZ		80195	5250880	PIPE	1
26	PAFZZ		80195	S213903	COUPLING	1
27	PAFZZ		80195	51415K78	PLUG,DUST	1
28	PAFZZ		39428	30345T5	LANYARD	1
29	PAFZZ	5340015150537	39428	86805T38	HOLDER,KEY	1
30	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	16
31	PAFZZ		80195	5251605	PIPE	1
32	PAFZZ		80195	5251610	BRACKET	2
33	PAFZZ	5305002693211	80205	MS90725-60	SCREW,CAP,HEXAGON HEAD	8
34	PAFZZ		39428	4464K37	ELBOW,PIPE	1
35	PAFZZ		80195	6603089	VALVE,BALL	1
36	PAFZZ		80195	6200974	NIPPLE,PIPE	1
37	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	6
38	PAFZZ	5305002693213	80205	MS90725-62	SCREW,CAP,HEXAGON HEAD	6
39	PAFZZ		3HMC9	20360	COUPLING	1
40	PAFZZ	5305015747229	39428	91309A626	.SCREW,CAP,HEXAGON HEAD	2
41	PCFZZ		3HMC9	10140	.SLIDE GASKET	1
42	PAFZZ	5310000881251	81349	M45913/1-4CG5C	.NUT,SELF-LOCKING,HEXAGON	2
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

V2 VALVE

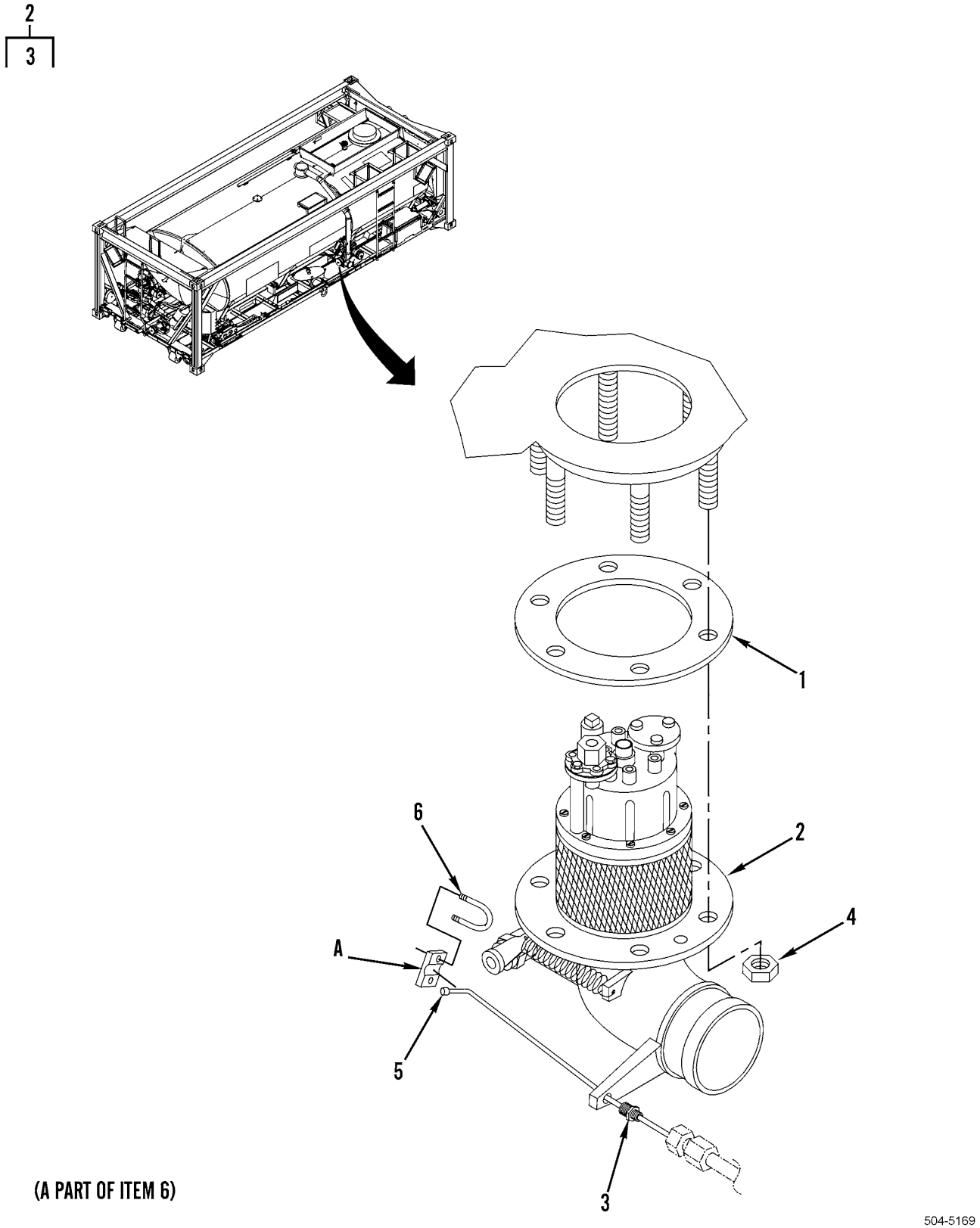


Figure 29. V2 Valve.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 05	
					FIG. 29 V2 VALVE	
1	PCFZZ	5330015356104	55242	10232D	GASKET	1
2	PBFHH		79318	F660	VALVE-INTERNAL 3"	1
3	PAFZZ	5365012908307	79318	2721205-1	.BUSHING,MACHINE THREAD	1
4	PAFZZ		39428	90640A133	SELF LOCK,NUT,HEX	6
5	PAFZZ		39428	8913T12	U-BOLT WIRE ROPE CLIP	1
6	PAFZZ		39428	3936T14	SLEEVE	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

V1 VALVE

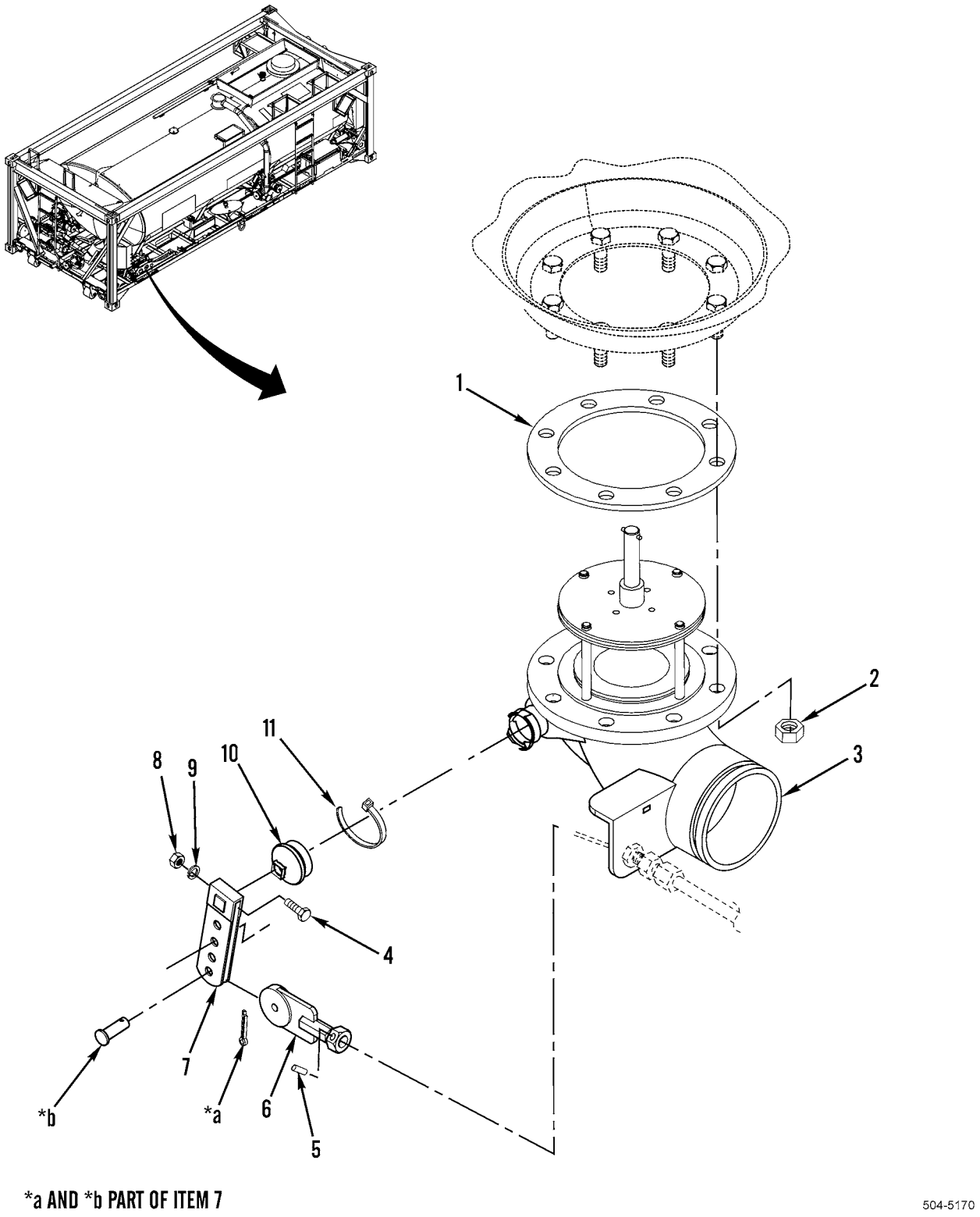


Figure 30. V1 Valve.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 06	
					FIG. 30 V1 VALVE	
1	PCFZZ	5330015356103	55242	10232E	GASKET	1
2	PAFZZ		39428	90640A133	SELF LOCK,NUT,HEX	8
3	PAFZZ		13226	EV46458ALTS	VALVE,EMERG 4"	1
4	PAFZZ	5305000712509	80204	B1821BH025C150N	SCREW CAP,HEX HD	1
5	PAFZZ		39428	3936T14	SLEEVE STOP	1
6	PAFZZ	5920015628032	13226	21050A	FUSE LINK,THERMAL	1
7	PAFZZ	3040014853120	13226	10587EY	LEVER,REMOTE CONTROL	1
8	PAFZZ	5310014664092	30554	88-22790-5	NUT,PLAIN,HEXAGON	1
9	PAFZZ	5310002095116	96906	MS35335-37	WASHER,LOCK	1
10	PCFZZ		13226	1994ONE	STUFFING BOX BOOT	1
11	PAFZZ	5975012062558	18876	11437794-1	STRAP,TIEDOWN,ELECTRICAL COMPONENTS	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

CONTROL LEVER ASSEMBLY (V1)

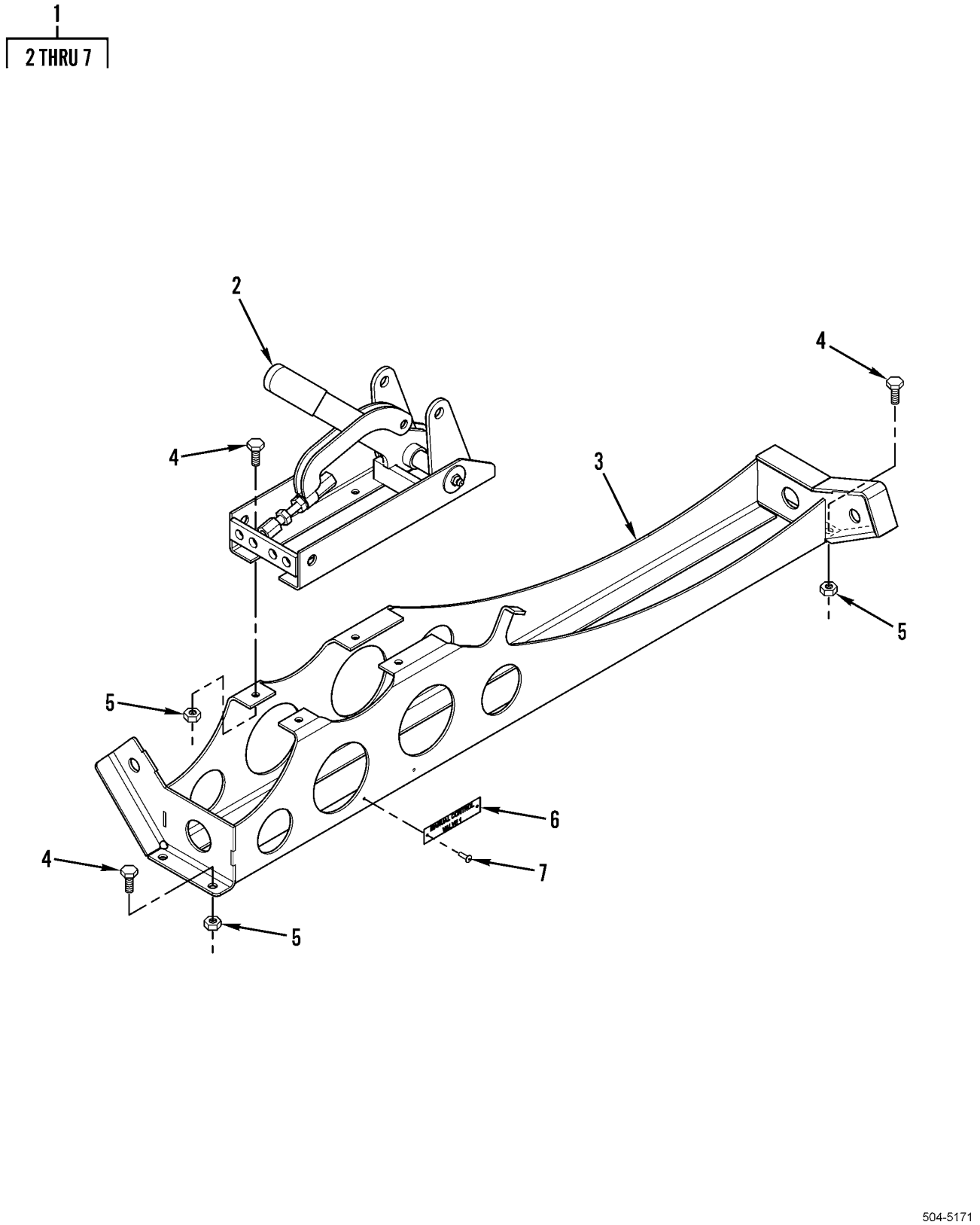


Figure 31. Control Lever Assembly (V1).

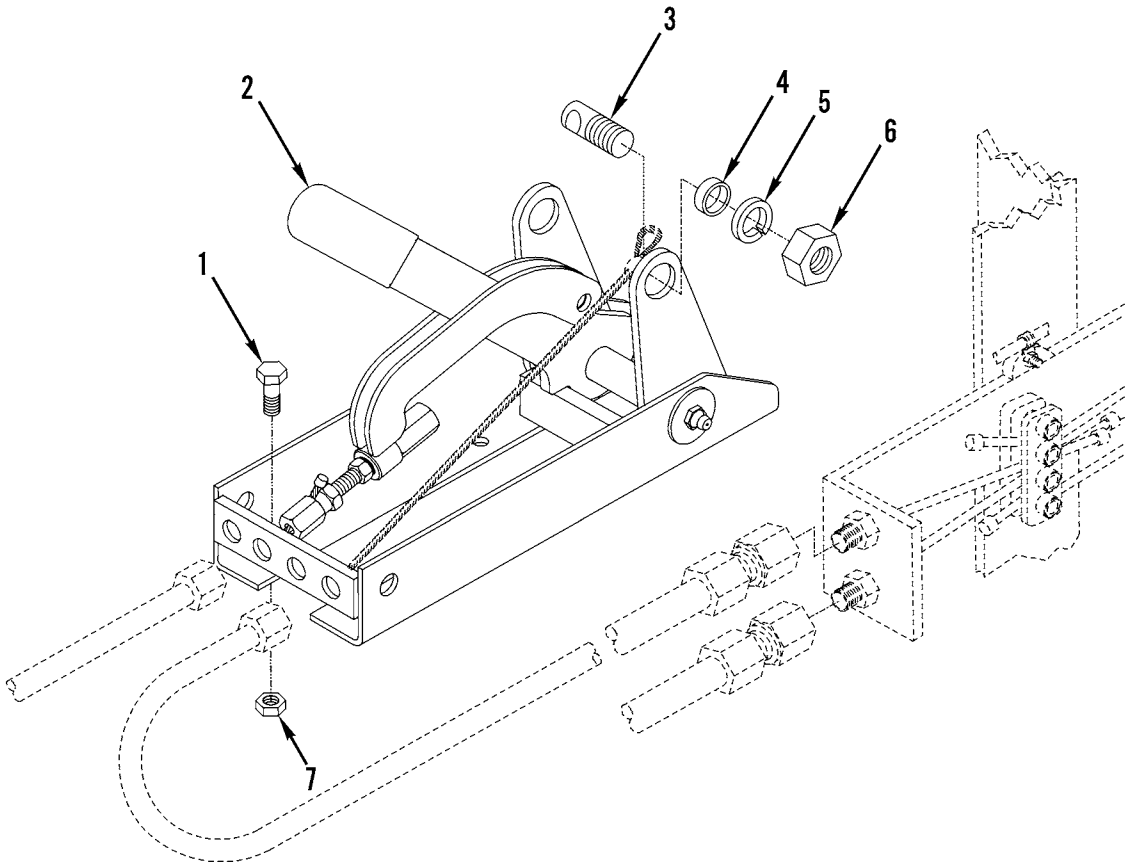
(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 07	
					FIG. 31 CONTROL LEVER ASSEMBLY (V1)	
1	PAFFF		80195	5251089	CONTROL ASSEMBLY	1
2	PBFZZ		13226	OP9001SL	.OPERATOR,MECHANICAL	1
3	PBFZZ		80195	5250841	.CONTROL ASSEMBLY	1
4	PAFZZ	5305015294402	2V507	92865A540	.SCREW,CAP,HEXAGON HEAD	8
5	PAFZZ	5310000881251	81349	M45913/1-4CG5C	.NUT,SELF-LOCKING,HEXAGON	8
6	PAFZZ		80195	5251038	.DATA PLATE	1
7	PAFZZ	5320012713318	39428	97525A415	.RIVET,BLIND	2
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

SIDE MECHANICAL OPERATOR CONTROL LEVER (V2)

2
3 THRU 6



504-5172

Figure 32. Side Mechanical Operator Control Lever (V2).

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 08	
					FIG. 32 SIDE MECHANICAL OPERATOR CONTROL LEVER (V2)	
1	PAFZZ	5305015294402	2V507	92865A540	SCREW,CAP,HEXAGON HEAD	4
2	PAFZZ		13226	OP9001SL	OPERATOR MECHANICAL	1
3	PAFZZ		13226	19622SL	.CABLE,CLAMP	1
4	PAFZZ		13226	19167SL	.BUSHING	1
5	PAFZZ		13226	9Q5908	.WASHER,LOCK	1
6	PAFZZ	5310014852086	13226	9Q5909	.NUT,PLAIN,HEXAGON	1
7	PAFZZ	5310000881251	81349	M45913/1-4CG5C	NUT,SELF-LOCKING,HEXAGON	4
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

CABLE GUIDES

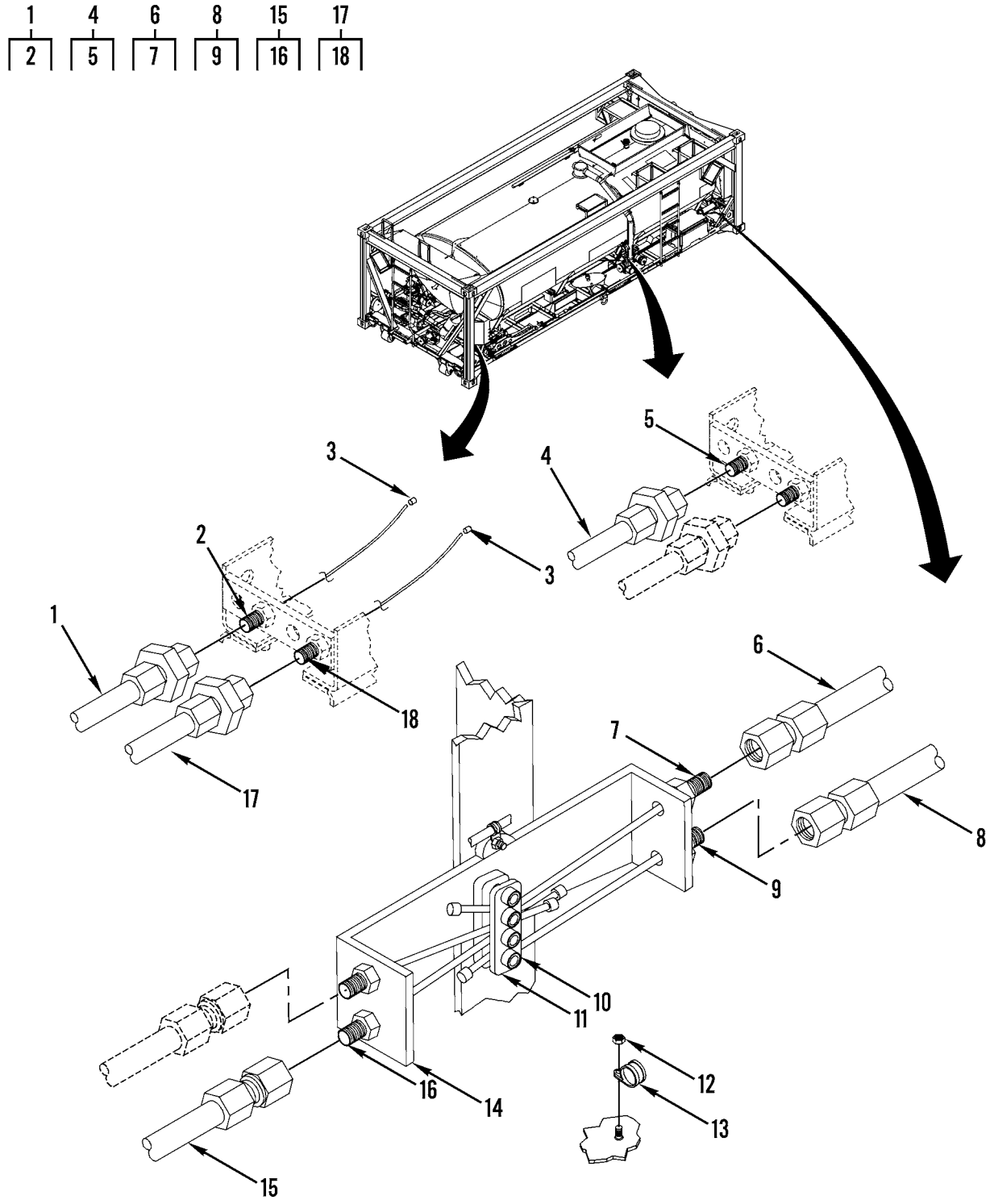
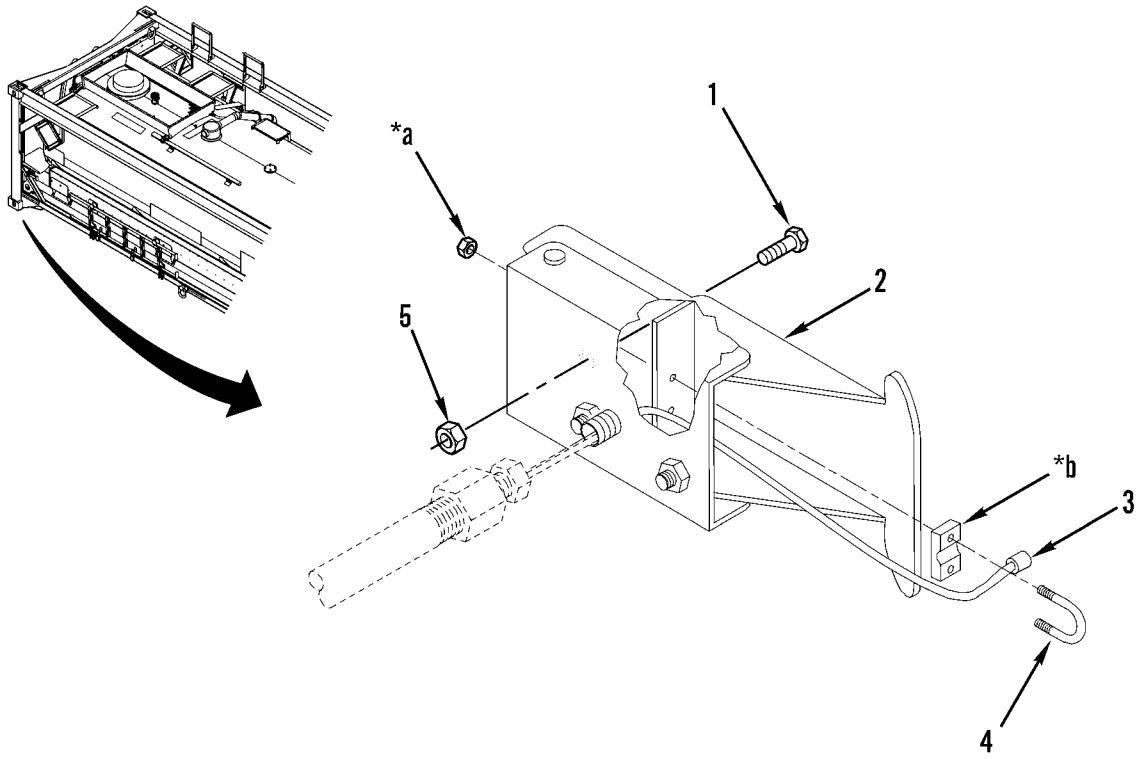


Figure 33. Cable Guides.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 09	
					FIG. 33 CABLE GUIDES	
1	PBFZZ		80195	5251566	CABLE DIS ASM GUIDE	1
2	PAFZZ	4730013205320	39428	4830K111	.NIPPLE,PIPE	1
3	PAFZZ		39428	3936T14	SLEEVE	12
4	PAFZZ		80195	5251581	SIDE LOAD ASM CABLE	1
5	PAFZZ	4730013205320	39428	4830K111	.NIPPLE,PIPE	1
6	PBFZZ		39428	5251572	PIPE,CABLE LH ASM	1
7	PAFZZ	4730013205320	39428	4830K111	.NIPPLE,PIPE	1
8	PBFZZ		80195	5251575	PIPE,CABLE RH ASM	1
9	PAFZZ	4730013205320	39428	4830K111	.NIPPLE,PIPE	1
10	PAFZZ	5305011898437	39428	91251A583	SCREW,CAP,SOCKET HEAD	4
11	PAFZZ		80195	5251400	BRACKET-CBL JUNC	1
12	PAFZZ	5310000881251	81349	M45913/1-4CG5C	NUT,SELF-LOCKING,HEXAGON	10
13	PAFZZ		80195	6001730	STRAP	10
14	PAFZZ		80195	5251368	BRACKET-CABLE JUNCT	1
15	PAFZZ		80195	5251578	CABLE GUIDE SIDE STOP AS	1
16	PAFZZ	4730013205320	39428	4830K111	.NIPPLE,PIPE	1
17	PAFZZ		80195	5251569	CABLE GUIDE,EMERGENCY VALVE	1
18	PAFZZ	4730013205320	39428	4830K111	.NIPPLE,PIPE	1
					END OF FIGURE	



*a PART OF ITEM 4
*b PART OF ITEM 4

504-5174

Figure 34. Emergency Stop Cable Guides.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 09	
					FIG. 34 EMERGENCY STOP CABLE GUIDES	
1	PAFZZ	5305015731548	07070	92196A245	SCREW,CAP,SOCKET HEAD	6
2	PBFZZ		80195	5251405	REMOTE CON. ACES	2
3	PAFZZ		39428	3936T14	SLEEVE	2
4	PAFZZ		39428	8913T12	U-BOLT,WIRE ROPE	2
5	PAFZZ	5310000881251	81349	M45913/1-4CG5C	NUT,SELF-LOCKING,HEXAGON	6
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

DISCHARGE HOSE

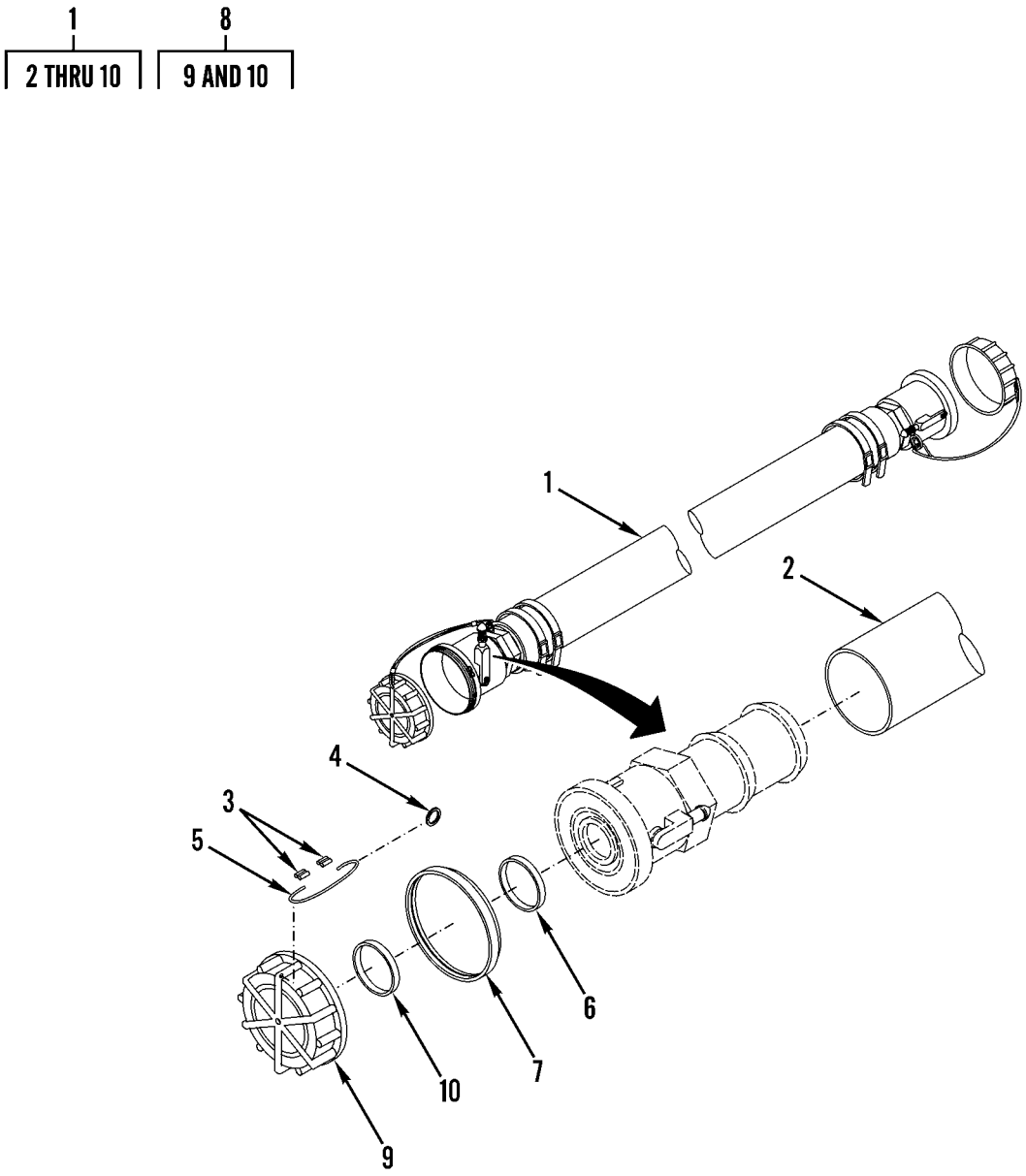


Figure 35. Discharge Hose.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 10	
					FIG. 35 DISCHARGE HOSE	
1	PAFFF	4720015827881	80195	5251747	HOSE AS,DISCHARGE 2" X 13'-3"	2
2	PAFZZ	4720015436638	90598	78009-1	.HOSE,NONMETALLIC	1
3	PAFZZ	4030004315537	0DT23	28-2-G	.SWAGING SLEEVE,WIRE ROPE	2
4	PAFZZ	5365014905797	0DT23	220482	.RING,CONNECTING,ROUND	1
5	PAFZZ	4010015436609	0DT23	82499-1800	.ROPE,WIRE	1
6	PCFZZ	5330014339203	0DT23	220146	.SEAL,PLAIN	1
7	PCFZZ	2510014567850	0DT23	220161	.CAP,BUMPER	1
8	PAFFF	2910014562273	0DT23	47062	.CAP,DUST	1
9	PAFZZ	4730015439501	0DT23	220162	..CAP,QUICK DISCONNECT	1
10	PCFZZ	5330014339203	0DT23	220146	..SEAL,PLAIN	1
					END OF FIGURE	

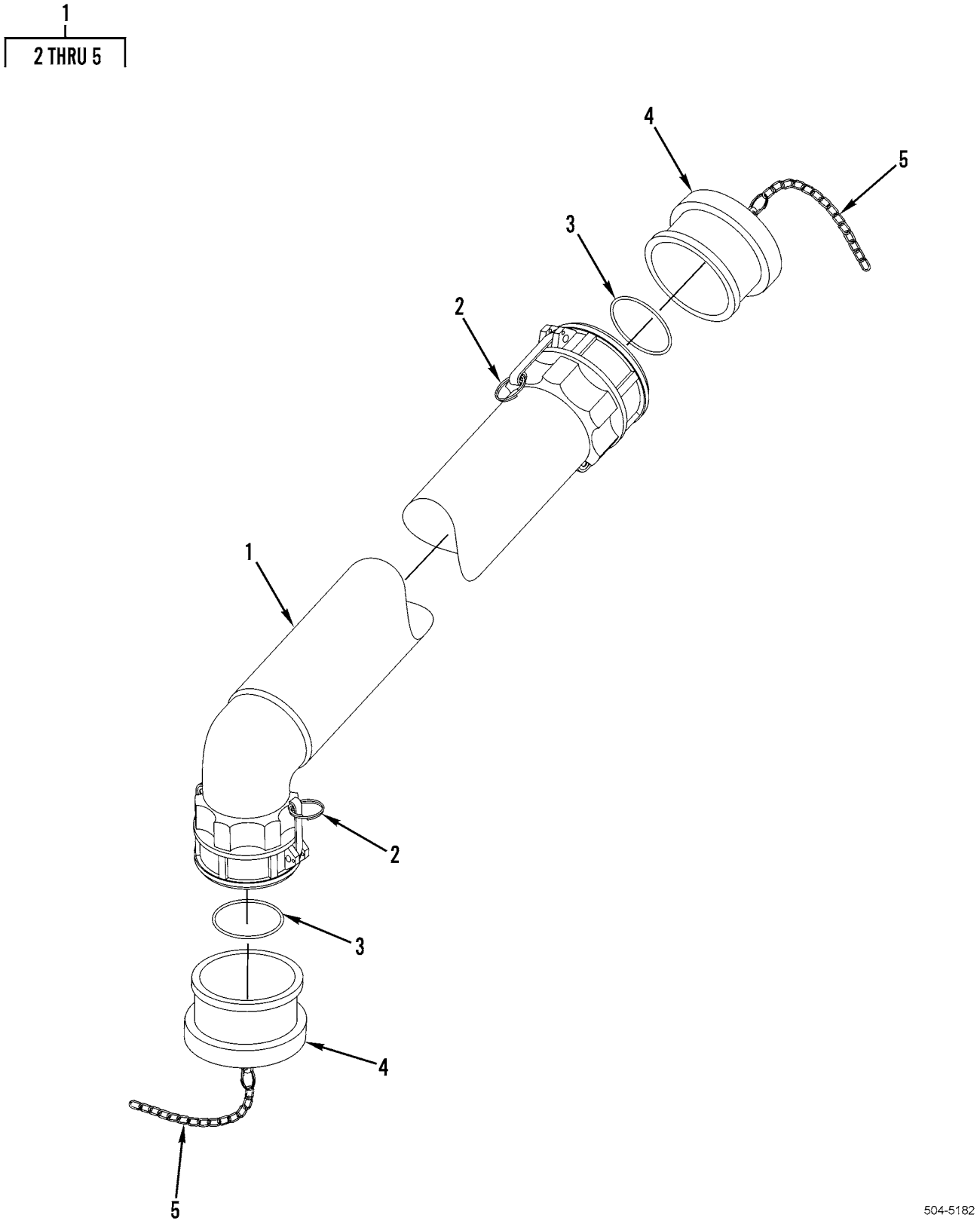


Figure 36. Discharge Hose.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 10	
					FIG. 36 DISCHARGE HOSE	
1	PAFZZ	4720015827975	80195	6001908	HOSE AS 3 X 3.5	1
2	PAFZZ	5340015150537	39428	86805T38	.HOLDER,KEY	6
3	PCFZZ	5330000889166	58536	AA59326-G8	.GASKET	2
4	PAFZZ	4730009290787	96906	MS27028-15	.CAP,QUICK DISCONNECT	2
5	PAFZZ	4010015264895	39428	3610T32	.CHAIN,WELDLESS	2
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

SUCTION HOSE

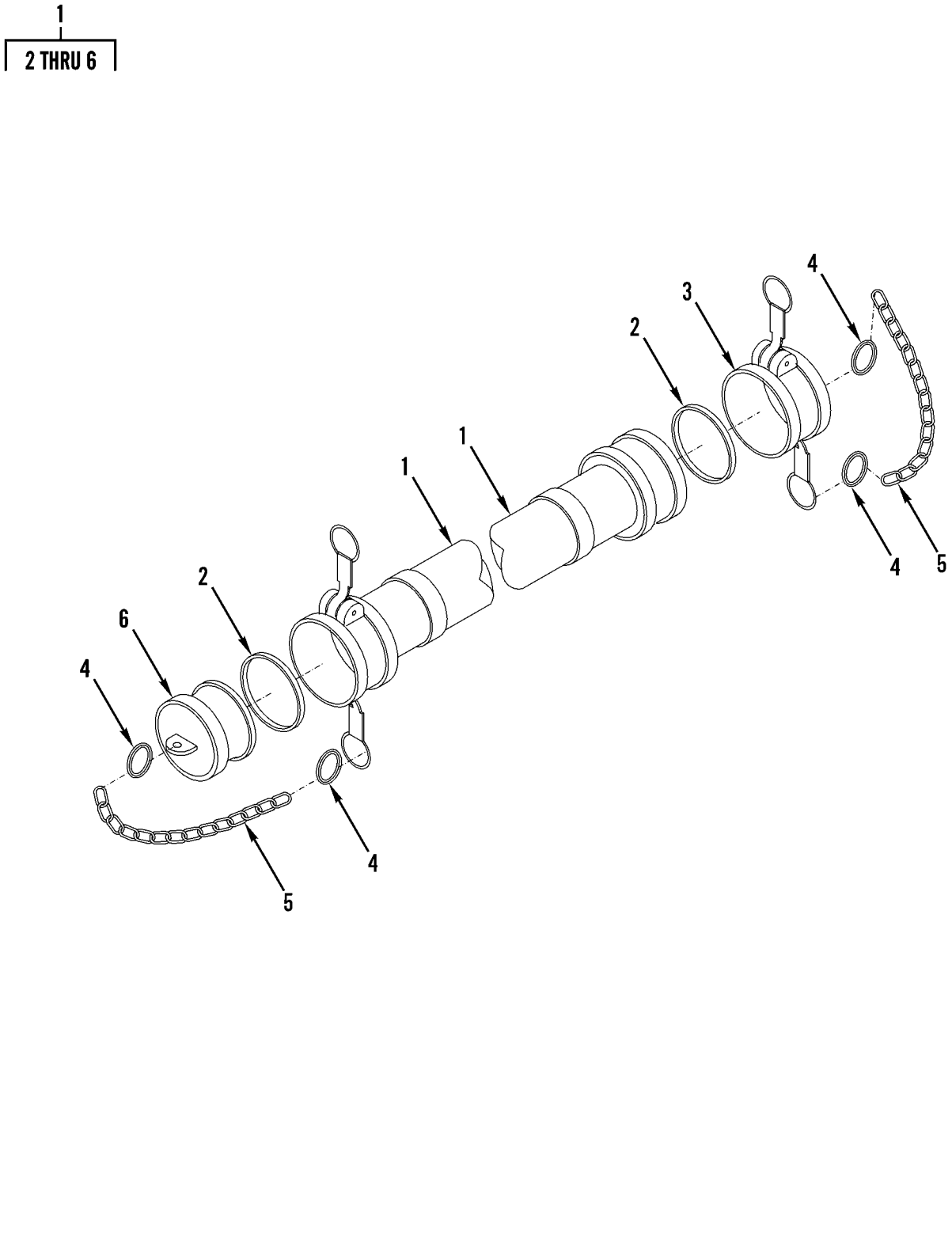


Figure 37. Suction Hose.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 11	
					GROUP 1101	
					FIG. 37 SUCTION HOSE	
1	PAFFF	4720015827865	0DT23	6001538	HOSE ASSY,NON-COLLAPSIBLE 4 IN X 15	2
1	PAFFF	4720015828153	80195	6001882	HOSE ASSY,NON-COLLAPSIBLE 4 IN X 8 FT 3 IN	1
1	PAFFF	4720015828171	80195	6001903	HOSE ASSY,NON-COLLAPSIBLE 4 IN X 6 FT 2 IN	1
2	PCFZZ	5330008994509	58536	AA59326-9	.GASKET	2
3	PAFZZ	4730006406156	58536	AA59326IX-9	.CAP,QUICK DISCONNECT	1
4	PAFZZ	5340015150537	39428	86805T38	.HOLDER,KEY	4
5	PAFZZ	4010015264895	39428	3610T32	.CHAIN,WELDLESS	2
6	PAFZZ	4730015436993	33813	40W	.PLUG,QUICK DISCONNECT	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

NOZZLE ASSEMBLY WITH VALVED DRY BREAK COUPLING

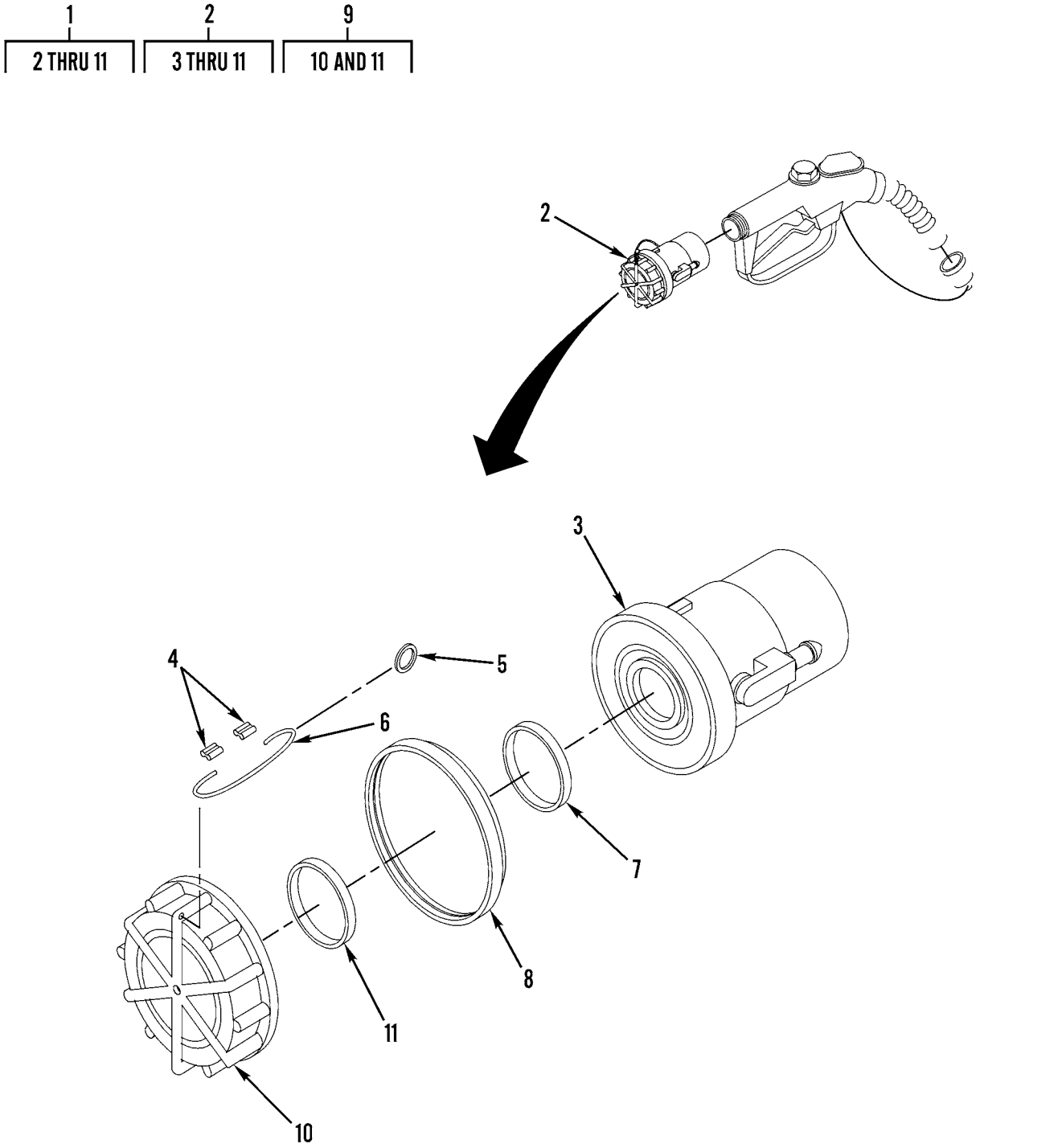


Figure 38. Nozzle Assembly With Valved Dry Break Coupling.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 1102	
					FIG. 38 NOZZLE ASSEMBLY WITH VALVED DRY BREAK COUPLING	
1	PAFZZ	4930015827514	41592	300ALMM200ANAJ	NOZZLE,VALVED	1
2	PBFZZ		0DT23	640208	.COUPLER,UNISEX	1
3	PBFZZ	4820014753173	0DT23	47031-1	..BODY,VALVE	1
4	PAFZZ	4030004315537	0DT23	28-2-G	..SWAGING SLEEVE,WIRE ROPE	2
5	PAFZZ	5365014905797	0DT23	220482	..RING,CONNECTING,ROUND	1
6	PAFZZ	4010015436609	0DT23	82499-1800	..ROPE,WIRE	1
7	PCFZZ	5330014339203	0DT23	220146	..SEAL,PLAIN	1
8	PCFZZ	2510014567850	0DT23	220161	..CAP,BUMPER	1
9	PAFFF	2910014562273	0DT23	47062	..CAP,DUST	1
10	PAFZZ	4730015439501	0DT23	220162	...CAP,QUICK DISCONNECT	1
11	PCFZZ	5330014339203	0DT23	220146	...SEAL,PLAIN	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

CAMLOCK ADAPTER

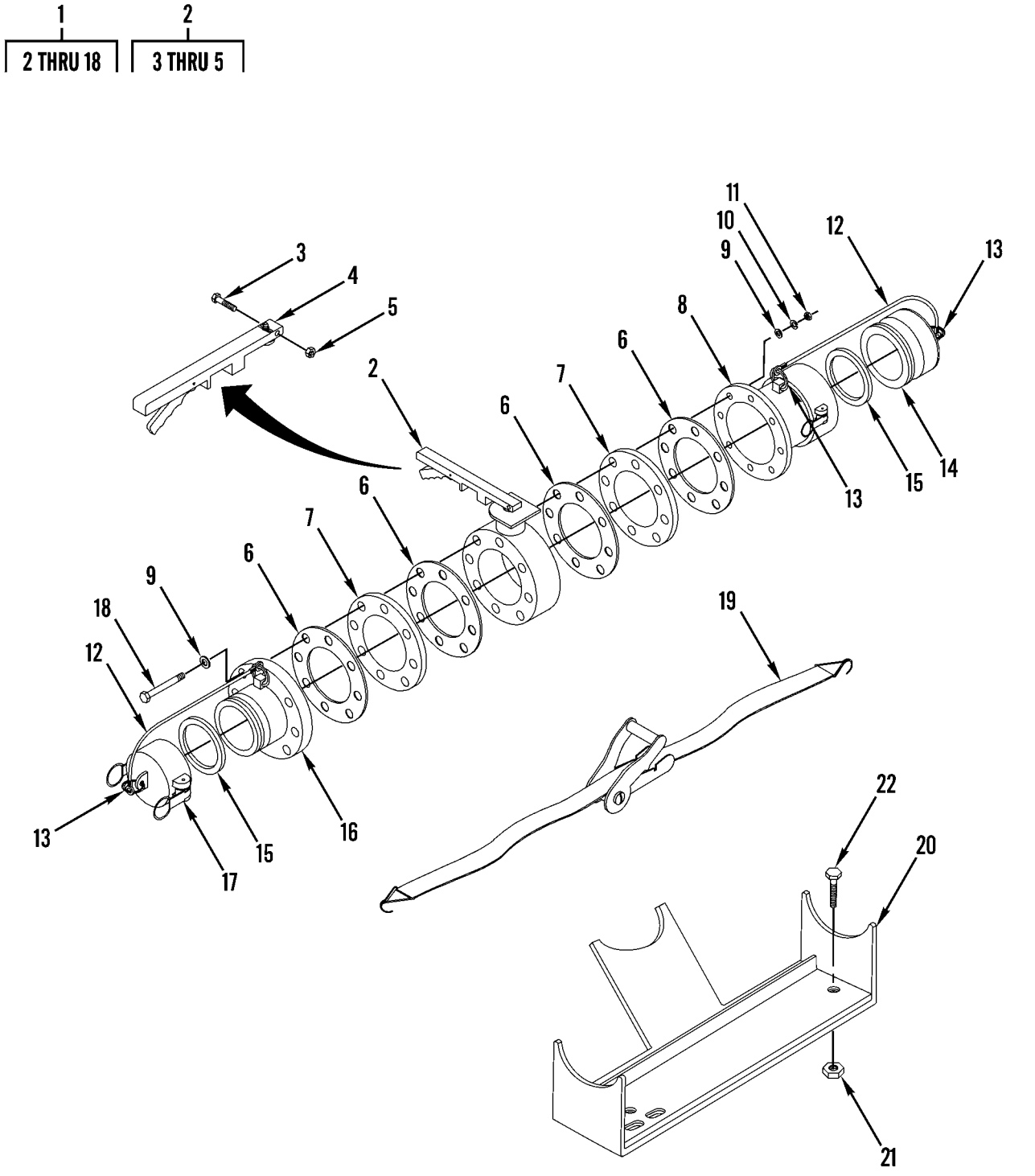


Figure 39. Camlock Adapter.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 1103	
					FIG. 39 CAMLOCK ADAPTER	
1	PAFFF	4730015827846	80195	5251391	CAMLOCK ADAPTER	1
2	PAFFF		13226	WD404 AL V	.VALVE	1
3	PAFZZ	5305015047427	13226	9Q5884	..SCREW,CAP,HEXAGON HEAD	2
4	PAFZZ	5340015047309	13226	26284AL	..LEVER,MANUAL CONTROL	1
5	PAFZZ	5310014664092	30554	88-22790-5	..NUT,PLAIN,HEXAGON	1
6	PCFZZ		13266	10233C	.GASKET	4
7	PAFZZ		3HMC9	20189D	.FLANGE, ALUM 0.8	2
8	PAFZZ		33813	PF40C	.FLANGE,COUPLER	1
9	PAFZZ	5310010831540	80195	0120388	.WASHER,FLAT	16
10	PAFZZ	5310006379541	65035	P49866-11	.WASHER,LOCK	8
11	PAFZZ	5310007320558	96906	MS51967-8	.NUT,PLAIN,HEXAGON	8
12	PAFZZ		39428	30345T5	.LANYARD	2
13	PAFZZ	5340015150537	39428	86805T38	.HOLDER,KEY	4
14	PAFZZ	4730015436993	33813	40W	.PLUG,QUICK DISCONNECT	1
15	PCFZZ		33813	5500240F	.GASKET,COUPLING	2
16	PAFZZ		33813	PF40A	.ADAPTER	1
17	PAFZZ	4730015436965	33813	40V	.CAP,QUICK DISCONNECT	1
18	PAFZZ		39428	91247A640	.HEX HEAD, CAP SCREW	8
19	PAFZZ		80195	6001716	STRAP 24"	1
20	PAFZZ		80195	5251396	BRACKET,COUPLER	1
21	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	4
22	PAFZZ		39428	91309A624	HEX,SCREW	4
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

TEE ASSEMBLY

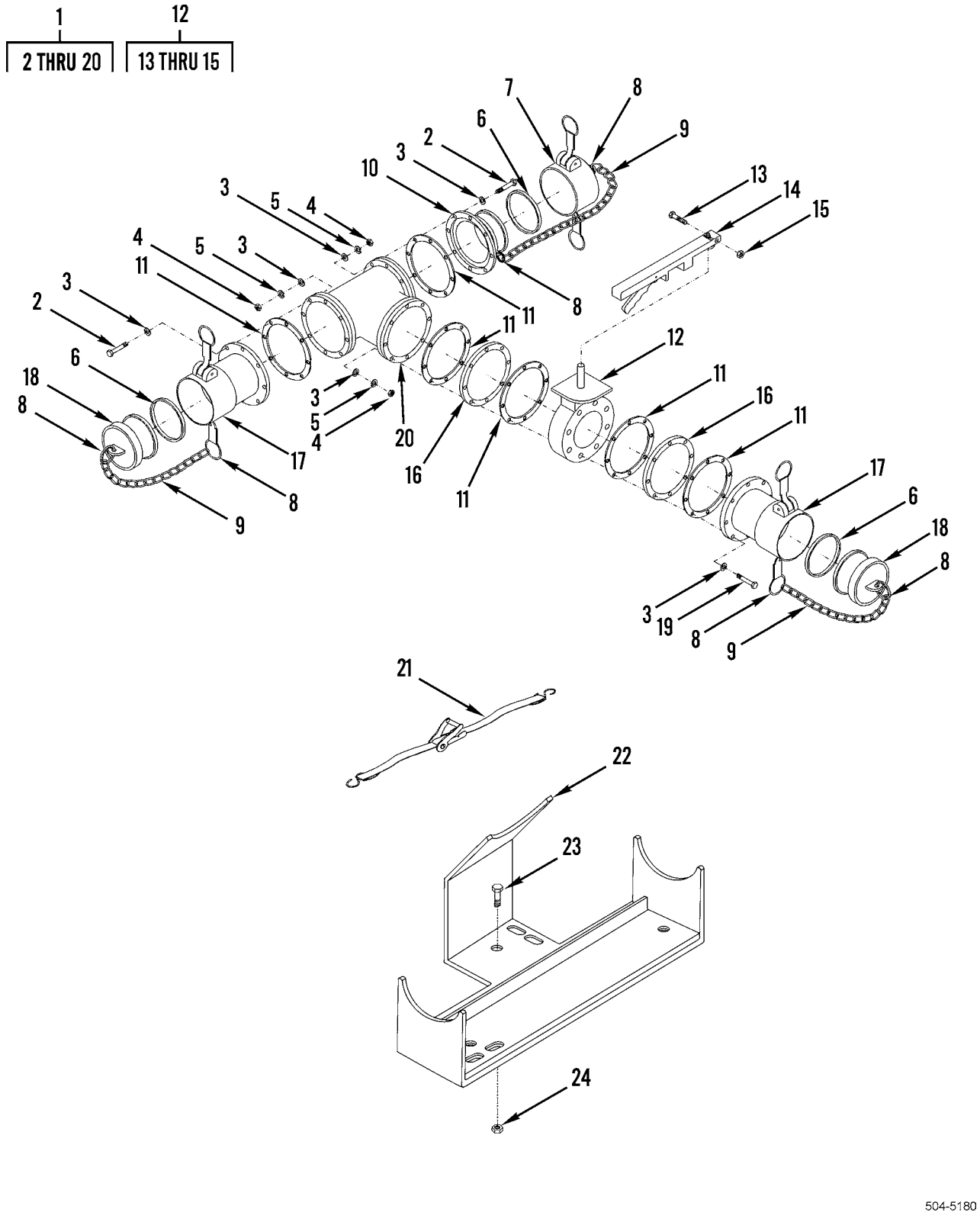


Figure 40. Tee Assembly.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 1104	
					FIG. 40 TEE ASSEMBLY	
1	PAFFF	4730015827894	80195	5251206	TEE 4"W/CAM FITTING	1
2	PAFZZ	5305008213869	80204	B1821BH038C175N	.SCREW,CAP,HEXAGON HEAD	16
3	PAFZZ	5310000806004	96906	MS27183-14	.WASHER,FLAT	48
4	PAFZZ	5310007320558	96906	MS51967-8	.NUT,PLAIN,HEXAGON	24
5	PAFZZ	5310005847889	80205	MS35338-53	.WASHER,LOCK	24
6	PCFZZ		33813	5500240F	.GASKET,COUPLING	3
7	PAFZZ	4730006406156	58536	AA59326IX-9	.CAP,QUICK DISCONNECT	1
8	PAFZZ		39428	86805T83	.HOLDER,KEY	6
9	PAFZZ	4010015264895	39428	3610T32	.CHAIN,WELDLESS	3
10	PAFZZ	4730015550264	33813	60564000SG	.ADAPTER,STRAIGHT,FLANGE TO HOSE ..	1
11	PCFZZ	5330015356103	55242	10232E	.GASKET	6
12	PAFZZ		13226	WD404 AL V	.VALVE	1
13	PAFZZ	5305015047427	13226	9Q5884	..SCREW,CAP,HEX HEAD	1
14	PAFZZ	5340015047309	13226	26284AL	..LEVER,MANUAL CONTROL	1
15	PAFZZ	5310007680318	96906	MS51967-14	..NUT,PLAIN,HEXAGON	1
16	PAFZZ		3HMC9	20189D	.FLANGE, ALUM 0.8	2
17	PAFZZ		33813	60584000SG	.COUPLING,FLANGED	2
18	PAFZZ		33813	1001240SG	.COUPLING HALF,PLUG	2
19	PAFZZ	5315010836851	80195	0109443	.PIN	8
20	PAFZZ	4730008405346	97403	13216E8243	.TEE,FLANGE	1
21	PAFZZ		80195	6001716	RATCHET STRAP	1
22	PBFZZ		80195	5251102	TEE BRACKET	1
23	PAFZZ		39428	91309A624	HEX,SCREW	3
24	PAFZZ	5310009359021	96906	MS51943-35	NUT,SELF-LOCKING,HEXAGON	3
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

FLANGE ADAPTER ASSEMBLY

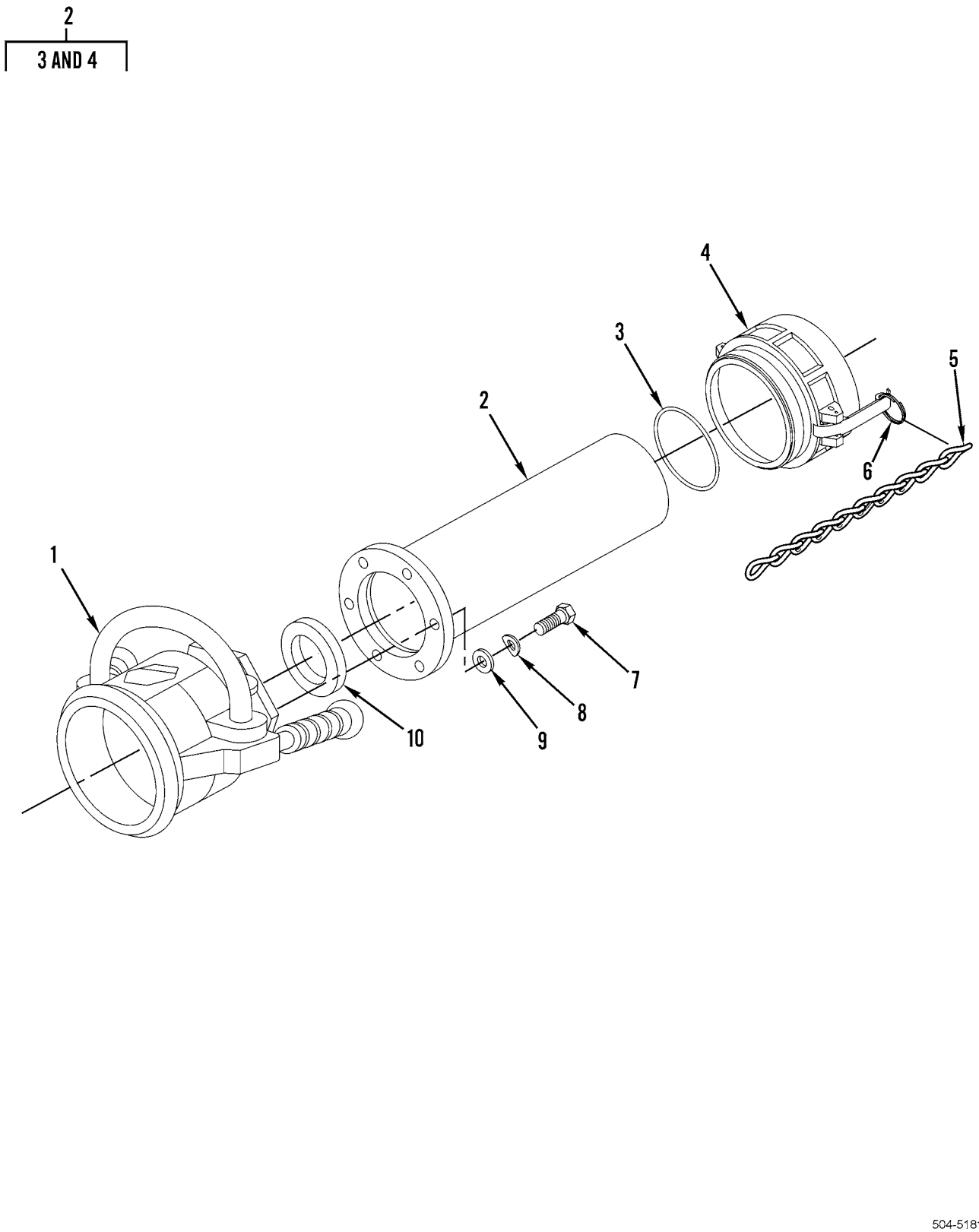


Figure 41. Flange Adapter Assembly.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP 1105	
					FIG. 41 FLANGE ADAPTER ASSEMBLY	
1	PAFZZ	4930014838060	86184	20170407J	NOZZLE, FUEL AND OIL SERVICING	1
2	PAFZZ	4730015827910	80195	5251624	ADAPTER FLANGE ASSEMBLY	1
3	PCFZZ	5330000889166	58536	AA59326-G8	.GASKET	1
4	PAFZZ	4730009290787	96906	MS27028-15	.CAP, QUICK DISCONNECT	1
5	PAFZZ	4010015264895	39428	3610T32	CHAIN,WELDLESS	2
6	PAFZZ	5340015150537	39428	86805T38	HOLDER,KEY	2
7	PAFZZ	5305014519220	39482	92865A542	SCREW,CAP,HEXAGON HEAD	6
8	PAFZZ	5310010830799	80195	0120380	WASHER,LOCK	6
9	PAFZZ	5310010831540	80195	0120388	WASHER,FLAT	6
10	PCFZZ	5331011112802	81343	AS568-151	O-RING	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

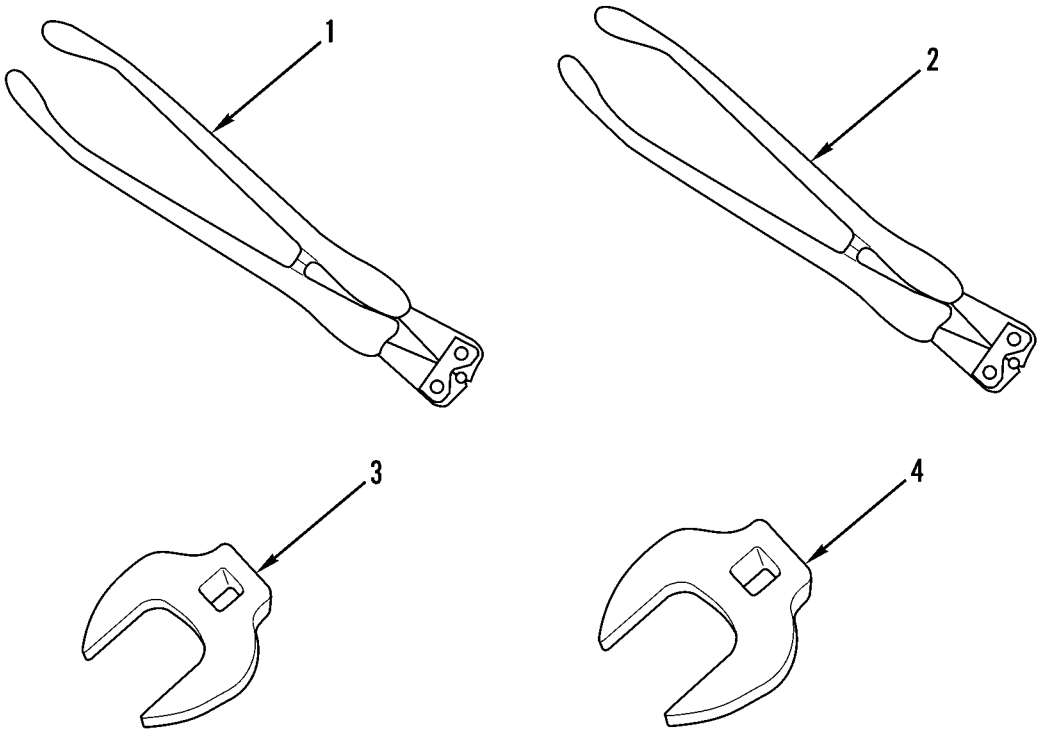
BULK MATERIAL

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					BULK MATERIAL	
1	PAFZZ		08754	543-738	HOSE	1
2	PAFZZ		73002	B716	FUEL HOSE	1
3	PAFZZ		80195	6603502	HOSE FUEL	1
4	PAFZZ		80195	6309334	TUBE-NYLON	1
5	PAFZZ		80195	6602543	TUBE-NYLON	1
6	PAFZZ		80195	6602757	TUBE-NYLON	1
7	PAFZZ		39428	3458T17	WIRE,ROPE	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

SPECIAL TOOLS



504-5185

Figure 42. Special Tools.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USEABLE ON CODES (UOC)	(7) QTY
					GROUP	
					FIG. 42 SPECIAL TOOLS	
1	PAFZZ	5120014968168	39428	3632T13	COMPRESSING TOOL,SPLICING SLEEVE ..	1
2	PAFZZ	5120004697607	76991	64CGMP	COMPRESSING TOOL,SPLICING SLEEVE ..	1
3	PAFZZ	5120013351155	55719	FC024A	CROWFOOT ATTACH,SOCKET WRENCH	1
4	PAFZZ	5120013351090	55719	FC030A	CROWFOOT ATTACHMENT,SOCKET WRENCH .	1
					END OF FIGURE	

END OF WORK PACKAGE

FIELD MAINTENANCE

NATIONAL STOCK NUMBER (NSN) INDEX

NATIONAL STOCK NUMBER INDEX

PART NUMBER	STOCK NUMBER	FIG.	ITEM
124818	5310-00-012-4818	7	14
MS24665-359	5315-00-013-7214	21	8
B1821BH038C125N	5305-00-068-0511	5	7
		14	11
		15	7
B1821BH025C150N	5305-00-071-2509	28	10
MS27183-14	5310-00-080-6004	22	6
		40	3
M45913/1-4CG5C	5310-00-088-1251	5	3
		5	3
		5	3
		14	6
		16	6
		20	7
		25	24
		27	28
		28	8
		28	10
		31	5
		32	7
		33	12
		34	5
AA59326-G8	5330-00-088-9166	36	3
		41	3
F417	4730-00-115-0452	28	12
AS3209-012	5331-00-166-0980	19	13
3036SL	5365-00-138-2158	2	2
AN316-9R	5310-00-153-5569	21	12
MS35335-37	5310-00-209-5116	19	5
		30	9
B1831BH031C075N	5306-00-226-4825	25	33
MS90725-60	5305-00-269-3211	25	10
		28	33
MS90725-62	5305-00-269-3213	28	38
4830K151	4730-00-419-3016	28	18
28-2-G	4030-00-431-5537	26	20
		26	35
		35	3
		38	4
64CGMP	5120-00-469-7607	42	2
B1821BH038C075N	5305-00-543-4372	3	1
		8	2
MS35338-53	5310-00-584-7889	40	5

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PART NUMBER	STOCK NUMBER	FIG.	ITEM
P49866-11	5310-00-637-9541	17	4
		39	10
AA59326IX-9	4730-00-640-6156	22	7
		25	15
		37	3
		40	7
MS51967-8	5310-00-732-0558	2	5
		39	11
		40	4
MS51967-14	5310-00-768-0318	28	24
		40	15
B1821BH038C175N	5305-00-821-3869	40	2
MS27183-9	5310-00-823-8804	5	4
		7	15
		14	3
		25	29
MS35691-37	5310-00-834-8734	21	13
13216E8243	4730-00-840-5346	40	20
36103	5310-00-880-7744	25	7
AA59326-9	5330-00-899-4509	37	2
A-A-52506-F-24	4730-00-908-3193	25	19
		26	12
MS27028-15	4730-00-929-0787	36	4
		41	4
MS51943-35	5310-00-935-9021	3	3
		4	3
		5	9
		5	15
		7	18
		9	4
		12	4
		14	9
		14	13
		15	9
		17	1
MS51943-35	5310-00-935-9021	22	4
		24	10
		25	4
		26	3
		27	33
		28	30
		28	37
		39	21
		40	24
4830K221	4730-00-975-0324	26	16
		27	14
NAS1352-6-16P	5305-00-978-9394	4	1
3119BN	5330-01-024-2311	2	6
13219E0462	5975-01-050-5707	9	1

NATIONAL STOCK NUMBER INDEX

PART NUMBER	STOCK NUMBER	FIG.	ITEM
0120388	5310-01-053-1540	12	2
3029SL	5306-01-077-5119	2	3
3031-SL	5310-01-077-6773	2	4
0120380	5310-01-083-0799	41	8
0120388	5310-01-083-1540	3	2
		4	2
		5	8
		7	17
		14	8
		15	8
		24	8
		27	32
		39	9
		41	9
0109443	5315-01-083-6851	40	19
0130999	5310-01-088-2491	10	2
11674728	5935-01-097-9974	17	3
AS568-151	5331-01-111-2802	41	10
76-102-01	4820-01-119-5389	25	11
		28	17
3560BN	5330-01-134-1986	2	7
30937	4210-01-147-6483	14	12
2733418	4730-01-158-9183	21	2
2731807-1	4820-01-161-6372	21	4
91251A583	5305-01-189-8437	19	10
		33	10
F646AD	4820-01-192-4496	21	1
11437794-1	5975-01-206-2558	30	11
4052-4	4820-01-221-2093	21	9
90780A011	5310-01-251-7510	3	13
		9	7
AE82096R	4730-01-259-5838	26	18
97525A415	5320-01-271-3318	7	4
		27	11
		31	17
2721205-1	5365-01-290-8307	29	3
4464K15	4730-01-300-4090	20	10
NAS620C6	5310-01-300-6397	18	2
90276A424	5305-01-308-3838	3	10
		9	8
4830K111	4730-01-320-5320	33	2
		33	5
		33	7
		33	9
		33	16
		33	18
FC030A	5120-01-335-1090	42	4
FC024A	5120-01-335-1155	42	3

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PART NUMBER	STOCK NUMBER	FIG.	ITEM
4464K53	4730-01-347-0810	25	21
		27	16
91114A031	5310-01-357-8847	3	12
		9	6
12380149	9905-01-379-5693	6	1
37-20-086-10	5340-01-424-1221	3	7
		9	5
220146	5330-01-433-9203	26	23
		26	27
		26	29
		26	32
		35	6
		35	10
		38	7
		38	11
6TMF/TYPEII	6140-01-446-9506	15	4
VC-5	6130-01-449-7594	16	1
92865A542	5305-01-451-9220	41	7
F-613-ACD	6680-01-454-9747	23	10
47062	2910-01-456-2273	26	25
		26	31
		35	8
		38	9
220161	2510-01-456-7850	26	24
		26	30
		35	7
		38	8
88-22790-5	5310-01-466-4092	19	4
		30	8
		39	5
47031-1	4820-01-475-3173	26	19
		38	3
863-000616	5325-01-481-1738	17	6
863-000313	5340-01-481-3344	20	8
20170407J	4930-01-483-8060	41	1
9Q5909	5310-01-485-2086	32	6
10587EY	3040-01-485-3120	30	7
220482	5365-01-490-5797	26	21
220482	5365-01-490-5797	26	36
		35	4
		38	5
3632T13	5120-01-496-8168	42	1
26284AL	5340-01-504-7309	25	8
		28	23
		39	4
		40	14
9Q5884	5305-01-504-7427	25	9
		28	22
		39	3

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PART NUMBER	STOCK NUMBER	FIG.	ITEM
9Q5884	5305-01-504-7427	40	13
92865A622	5305-01-504-8288	7	19
		12	1
		24	9
3225T24	5340-01-512-3422	16	5
86805T38	5340-01-515-0537	28	29
		36	2
		37	4
		39	13
		41	6
92620A624	5305-01-517-5475	9	2
		14	14
811000-1	4930-01-517-6939	1	1
3610T32	4010-01-526-4895	36	5
		37	5
		41	5
92865A540	5305-01-529-4402	31	4
		32	1
98026A030	5310-01-532-7068	19	9
92620A621	5305-01-533-3680	17	5
91030A033	5310-01-533-9640	15	11
10232E	5330-01-535-6103	21	7
		30	1
		40	11
10232D	5330-01-535-6104	29	1
91251A345	5305-01-537-0631	17	8
6001225	5360-01-540-8782	10	3
82499-1800	4010-01-543-6609	26	22
		26	34
		35	5
		38	6
78009-1	4720-01-543-6638	35	2
40V	4730-01-543-6965	39	17
		37	6
		39	14
220162	4730-01-543-9501	26	26
		26	33
		35	9
		38	10
5011T39	5340-01-544-0294	21	5
91114A033	5310-01-549-2705	8	3
91100A170	5310-01-553-7188	6	3
		16	3
60564000SG	4730-01-555-0264	40	10
4052-16-1	5340-01-561-7456	21	10
21050A	5920-01-562-8032	30	7
6000071	5330-01-566-8357	28	20
4052-16	3040-01-572-2203	21	11

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PART NUMBER	STOCK NUMBER	FIG.	ITEM
92196A245	5305-01-573-1548	6	2
		16	2
		34	1
300ALMM200ANAJ	4930-01-582-7514	38	1
5251389	2040-01-582-7522	2	8
5252235	6680-01-582-7535	24	2
5251391	4730-01-582-7846	39	1
6001538	4720-01-582-7865	37	1
5251747	4720-01-582-7881	35	1
5251206	4730-01-582-7894	40	1
5251624	4730-01-582-7910	41	2
6001908	4720-01-582-7975	36	1
6001882	4720-01-582-8153	37	2
6001903	4720-01-582-8171	37	3

END OF WORK PACKAGE

FIELD MAINTENANCE

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
94222	37-20-086-10	5340-01-424-1221	3	7
			9	5
94222	38-106-04-16		3	5
57661	76-102-01	4820-01-119-5389	25	11
			28	17
30554	88-22790-5	5310-01-466-4092	19	4
			30	8
			39	5
08754	543-738		BULK	1
4X630	863-000616	5325-01-481-1738	17	6
4X630	863-000313	5340-01-481-3344	20	8
79318	4052-4	4820-01-221-2093	21	9
79318	4052-16	5340-01-561-7456	21	10
			21	11
K9089	9951.0031		8	4
3HMC9	20361		25	23
			28	5
13445	30407-50		27	31
03670	30937	4210-01-147-6483	14	12
49181	36103	5310-00-880-7744	25	7
0DT23	47031-1	4820-01-475-3173	26	19
			38	3
0DT23	47062	2910-01-456-2273	26	25
			26	31
			35	8
			38	9
90598	78009-1	4720-01-543-6638	35	2
0DT23	82499-1800	4010-01-543-6609	26	22
			26	34
			35	5
			38	6
80195	0109443	5315-01-083-6851	40	19
80195	0120233		27	34
80195	0120380	5310-01-083-0799	41	8
80195	0120388	5310-01-083-1540	3	2
			4	2
			5	8
			7	17
			12	2
			14	8
			15	8
			24	8
			27	32
			39	9
			41	9
59582	121019-1		27	7
80195	0121973		5	10
80195	0122017		5	12
24617	124818	5310-00-012-4818	7	14
80195	0130999	5310-01-088-2491	10	2

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
59582	133033-1		27	9
0J8Y6	133076-02		27	4
0J8Y6	133078-1		27	25
80195	0180020		27	29
80195	0180037		14	4
80195	0180122		14	7
0DT23	220146	5330-01-433-9203	26	23
			26	27
			26	29
			26	32
			35	6
			35	10
			38	7
			38	11
0DT23	220161	2510-01-456-7850	26	24
			26	30
			35	7
			38	8
0DT23	220162	4730-01-543-9501	26	26
			26	33
			35	9
			38	10
0DT23	220482	5365-01-490-5797	26	21
			26	36
			35	4
			38	5
0DT23	640208		38	2
98255	810126		11	5
59582	901001-90		27	8
0J8Y6	902006-60		27	24
59582	904001-37		27	10
0J8Y6	904002-25		27	3
59585	904004-59		27	22
0J8Y6	904005-56		27	2
0J8Y6	904006-60		27	5
59585	904006-16		27	21
59585	904006-63		27	23
79318	2721205-1	5365-01-290-8307	29	3
79318	2731807-1	4820-01-161-6372	21	4
79318	2733418	4730-01-158-9183	21	2
79318	2734794-101		21	6
80195	3311945		10	4
80195	3370314		24	7
			27	30
39428	3458T17		BULK	7
80195	5250118		13	2
80195	5250126		13	1
80195	5250424		19	7
80195	5250426		19	12
80195	5250819		4	4
80195	5250841		31	3
80195	5250870		22	3
80195	5250877		28	9
80195	5250880		28	25
80195	5250882		25	17
80195	5250885		28	11

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
80195	5250890		25	28
80195	5250929		26	1
80195	5250942		17	2
80195	5250961		11	1
80195	5250962		20	1
80195	5250968		7	5
80195	5250969		7	2
80195	5250973		7	3
80195	5250980		7	6
80195	5250987		11	2
80195	5250992		19	16
80195	5251018		11	4
80195	5251038		31	6
80195	5251055		11	3
80195	5251085		25	34
80195	5251089		31	1
80195	5251093		15	5
80195	5251102		40	22
80195	5251107		19	17
80195	5251117		19	14
80195	5251119		7	8
80195	5251121		19	15
80195	5251140		25	2
80195	5251189		22	2
80195	5251206	4730-01-582-7894	40	1
80195	5251248		15	10
80195	5251249		15	6
80195	5251257		5	6
80195	5251259		5	13
80195	5251263		5	5
80195	5251264		5	14
80195	5251265		5	14
80195	5251267		19	6
80195	5251268		19	3
80195	5251277		5	2
80195	5251278		5	1
80195	5251292		3	9
80195	5251314		25	27
80195	5251317		25	1
80195	5251318		26	4
80195	5251320		26	5
80195	5251323		27	12
80195	5251324		27	19
80195	5251368		31	14
80195	5251381		27	17
80195	5251386		7	12
80195	5251389	2040-01-582-7522	2	8
80195	5251391	4730-01-582-7846	39	1
80195	5251396		39	20
80195	5251397		7	11
80195	5251400		31	11
80195	5251403		27	26
80195	5251405		34	2
80195	5251556		20	5
80195	5251559		26	10
80195	5251560		26	15

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
80195	5251562		27	13
80195	5251563		28	19
80195	5251566		33	1
80195	5251569		33	17
39428	5251572		33	6
80195	5251575		33	8
80195	5251578		33	15
80195	5251581		33	4
80195	5251605		28	31
80195	5251610		28	32
80195	5251624	4730-01-582-7910	41	2
80195	5251627		7	1
80195	5251662		4	6
80195	5251675		4	5
80195	5251691		3	11
80195	5251692		27	35
80195	5251697		25	31
80195	5251701		3	15
80195	5251703		14	1
80195	5251707		14	2
80195	5251712		14	10
80195	5251714		14	5
80195	5251726		3	8
80195	5251737		3	4
80195	5251738		3	14
80195	5251739		27	1
59582	5251740		27	6
80195	5251747	4720-01-582-7881	35	1
81095	5252227		18	3
80195	5252230		12	3
80195	5252234		24	1
80195	5252235	6680-01-582-7535	24	2
80195	5252236		24	3
80195	5252240		24	4
80195	5252268		27	27
80195	6000071	5330-01-566-8357	28	20
80195	6000855		25	14
80195	6001225	5360-01-540-8782	10	3
0DT23	6001538	4720-01-582-7865	37	1
80195	6001675		7	10
80195	6001676		7	13
80195	6001679		7	9
80195	6001716		2	9
			7	20
			39	19
			40	21
80195	6001730		33	13
80195	6001882	4720-01-582-8153	37	1
80195	6001903	4720-01-582-8171	37	1
80195	6001908	4720-01-582-7975	36	1
80195	6100388		19	1
80195	6100440		19	11
80195	6100459		23	2
80195	6100666		19	2
80195	6200941		20	4
80195	6200971		25	20

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
80195	6200974		25	13
			28	36
80195	6200978		25	18
80195	6309334-22		23	5
80195	6309334		28	2
			BULK	4
80195	6602543		23	9
			BULK	5
80195	6602757		23	3
			BULK	6
80195	6603073		20	6
80195	6603080		20	2
80195	6603088		26	17
80195	6603089		28	35
80195	6603097		28	14
80195	6603136		23	8
80195	6603288		28	3
80195	6603289		23	11
			28	1
			28	16
80195	6603502-14.6		20	3
80195	6603502		BULK	3
80195	6603516		23	12
80195	6603579		26	14
			27	15
80195	6603764		2	1
80195	6703608		15	2
80195	6703609		15	1
80195	6703610		15	3
80195	6703627		9	3
80195	9413569		28	15
18876	11437794-1	5975-01-206-2558	30	11
19207	11674728	5935-01-097-9974	17	3
19207	12380149	9905-01-379-5693	6	1
79154	1-1/4 IN77/75/78T		25	26
			28	7
33813	1001240SG		40	18
55242	10232D	5330-01-535-6104	29	1
55242	10232E	5330-01-535-6103	21	7
			30	1
			40	11
13266	10233C		25	5
			39	6
13226	10587EY	3040-01-485-3120	30	7
97403	13216E8243	4730-00-840-5346	40	20
19207	13219E0462	5975-01-050-5707	9	1
13226	19167SL		32	4
13226	19622SL		32	3
13226	1994ONE		30	10
86184	20170407J	4930-01-483-8060	41	1
3HMC9	20189D		39	7
			40	16
13226	21050A	5920-01-562-8032	30	6
13226	26284AL	5340-01-504-7309	25	8
			28	23
			39	4

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
13226	26284AL	5340-01-504-7309	40	14
0DT23	28-2-G	4030-00-431-5537	26	20
			26	35
			35	3
			38	4
41592	300ALMM200ANAJ	4930-01-582-7514	38	1
13226	3029SL	5306-01-077-5119	2	3
13226	3031-SL	5310-01-077-6773	2	4
39428	30345T5		3	6
			22	8
			25	16
			28	28
			39	12
13226	3036SL	5365-00-138-2158	2	2
39428	3079T44		7	16
			24	5
13226	3119BN	5330-01-024-2311	2	6
39428	3225T24	5340-01-512-3422	16	5
13226	3560BN	5330-01-134-1986	2	7
39428	3610T32	4010-01-526-4895	36	5
			40	9
			41	5
			37	5
39428	3883T43		24	6
39428	3936T14		7	7
			29	6
			30	6
			33	3
			34	3
33813	40V	4730-01-543-6965	39	17
33813	40W	4730-01-543-6993	37	6
			39	14
39428	4459K75		18	8
39428	4464K15	4730-01-300-4090	20	10
39428	4464K16		26	17
39428	4464K276		20	9
39428	4464K37		25	12
39428	4464K37		28	34
39428	4464K53	4730-01-347-0810	25	21
			27	16
39428	4561K14		20	11
39428	4830K111	4730-01-320-5320	33	2
			33	5
			33	7
			33	9
			33	16
			33	18
39428	4830K151	4730-00-419-3016	28	18
39428	4830K221	4730-00-975-0324	26	16
			27	14
3A054	5011T39	5340-01-544-0294	21	5
39428	5011T67		21	3
76991	51MJ	5120-00-493-7737	42	1
80195	51415K78		28	27
39428	5182K119		23	6
39428	5182K156		23	4

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
3A054	54155K17		23	7
			26	8
8754	543-738-X		26	9
33813	5500240F		39	15
			40	6
33813	60564000SG	4730-01-555-0264	40	10
33813	60584000SG		40	17
0DT23	64019H		26	28
76991	64CGMP	5320-00-469-7607	42	2
19207	6TMF/TYPEII	6140-01-446-9506	15	4
98255	811000-1	4930-01-517-6939	1	1
39428	86805T38	5340-01-515-0537	28	29
			36	2
			37	4
			39	13
			41	6
39428	86805T83		40	8
39428	8913T12		29	5
			34	4
39428	90045A016		6	4
			16	4
39428	90045A018		17	7
39428	90276A424	5305-01-308-3838	3	10
			9	8
39428	90480A011	5310-01-251-7510	9	7
39428	90640A133		18	1
			29	4
			30	2
39428	90780A011	5310-01-251-7510	3	13
39428	91030A033	5310-01-533-9640	15	11
39428	91100A170	5310-01-553-7188	6	3
			16	3
39428	91114A031	5310-01-357-8847	3	12
			9	6
39428	91114A033	5310-01-549-2705	8	3
39428	91247A640		39	18
2V507	91251A345	5305-01-537-0631	17	8
39428	91251A351		28	13
39428	91251A583	5305-01-189-8437	19	10
			31	10
39428	91309A624		22	5
			39	22
			40	23
			22	1
			25	25
			26	2
			27	20
			28	4
			28	6
39428	91837A030		25	30
07070	92196A245	5305-01-573-1548	6	2
			16	2
			34	1
39428	92501A030		10	1
39428	92620A621	5305-01-533-3680	17	5
39428	92620A624	5305-01-517-5475	9	2

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
39428	92620A624	5305-01-517-5475	14	14
39428	92865A107		19	8
2V507	92865A540	5305-01-529-4402	31	4
			32	1
39482	92865A542	5305-01-451-9220	41	7
2V507	92865A622	5305-01-504-8288	7	19
			12	1
			24	9
39428	94135K44		5	11
39428	97525A415	5320-01-271-3318	7	4
			27	11
			31	17
39428	97525A615		11	6
39428	98026A030	5310-01-532-7068	19	9
13226	9Q5884	5305-01-504-7427	25	9
			28	22
			39	3
			40	13
13226	9Q5908		32	5
13226	9Q5909	5310-01-485-2086	32	6
58536	A-A-52506-F-24	4730-00-908-3193	25	19
			26	12
58536	AA59326-9	5330-00-899-4509	37	2
96906	AA59326-G8	5330-00-088-9166	36	3
			41	3
58536	AA59326IX-9	4730-00-640-6156	22	7
			25	15
			37	3
			40	7
00624	AE82096R	4730-01-259-5838	26	18
80205	AN316-9R	5310-00-153-5569	21	12
81343	AS3209-012	5310-00-166-0980	19	13
81343	AS568-151	5310-01-111-2802	41	10
80204	B1821BH025C150N	5305-00-071-2509	30	4
80204	B1821BH038C075N	5305-00-543-4372	3	1
			8	2
80204	B1821BH038C125N	5305-00-068-0511	5	7
			14	11
			15	7
80204	B1821BH038C175N	5305-00-821-3869	40	2
80204	B1831BH031C075N	5306-00-226-4825	25	33
73002	B716		26	11
			BULK	2
73002	B716-X		25	32
13226	EV46458ALTS		30	3
92003	F-613-ACD	6680-01-454-9747	23	10
79318	F417	4730-00-115-0452	28	12
79318	F646AD	4820-01-192-4496	21	1
79318	F660		29	2
55719	FC024A	5120-01-335-1155	42	3
55719	FC030A	5120-01-335-1090	42	4
1G3R1	HB100SS		26	13
			27	18
			25	3
			26	7
80195	L238039		25	22

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
81349	M45913/1-4CG5C	5310-00-088-1251	5	3
			14	6
			16	6
			20	7
			25	24
			27	28
			28	8
			28	10
			31	5
			32	7
			33	12
			34	5
92858	MGR75-20		8	1
80205	MS24665-359	5315-00-013-7214	21	8
58536	MS27028-15	4730-00-929-0787	36	4
			41	4
96906	MS27183-14	5310-00-080-6004	22	6
			40	3
96906	MS27183-9	5310-00-823-8804	5	4
			7	15
			14	3
			25	29
96906	MS35335-37	5310-00-209-5116	19	5
			30	9
80205	MS35338-53	5310-00-584-7889	40	5
96906	MS35691-37	5310-00-834-8734	21	13
96906	MS51943-35	5310-00-935-9021	3	3
			4	3
			5	9
			7	18
			9	4
			12	4
			14	9
			14	13
			15	9
			17	1
			22	4
			24	10
			25	4
			26	3
			27	33
			28	30
			28	37
			39	21
			40	24
96906	MS51967-14	5310-00-768-0318	28	24
			40	15
96906	MS51967-8	5310-00-732-0558	2	5
			39	11
			40	4
80205	MS90725-62	5305-00-269-3213	28	38
80205	MS90725-60	5305-00-269-3211	25	10
			28	33
80205	NAS1352-6-16P	5305-00-978-9394	4	1
96906	NAS620C6	5310-01-300-6397	18	2

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
13226	OP9001SL		31	2
			32	2
65035	P49866-11	5310-00-637-9541	17	4
			39	10
33813	PF40A		39	16
33813	PF40C		39	8
03743	ST4538	5975-00-224-5106	27	36
80195	S213903		28	26
80195	T181741		23	1
09GZ5	VC-5	6130-01-449-7594	16	1
1G3R1	VSS200S		26	6
77342	W31-X2M1G-20	5925-00-855-3987	17	4
13226	WD404 AL V		28	21
			39	2
			40	12
13226	WD404AL		25	6

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CHAPTER 8

SUPPORTING INFORMATION

FIELD MAINTENANCE

REFERENCES

Scope, Army Regulations, DA Pamphlets, Field Manuals, Forms, Miscellaneous, Supply Catalogs, Technical Manuals

SCOPE

This work package lists the publications referenced in this manual.

ARMY REGULATIONS

Environmental Protection and Enhancement . . . . . AR 200-1

DA PAMPHLETS

The Army Maintenance Management System (TAMMS) Users Manual . . . . . DA PAM 750-8

FIELD MANUALS

Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological and Chemical (NBC) Protection . . . . . FM 3-11.4

Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological and Nuclear Decontamination . . . . . FM 3-11.5

First Aid . . . . . FM 4-25.11

Operation and Maintenance of Ordnance Materiel in Cold Weather . . . . . FM 9-207

Concepts and Equipment of Petroleum Operations . . . . . FM 10-67-1

Basic Cold Weather Manual . . . . . FM 31-70

Northern Operations . . . . . FM 31-71

FORMS

Recommended Changes to Publications and Blank Forms . . . . . DA Form 2028

Equipment Inspection and Maintenance Worksheet . . . . . DA Form 2404

Equipment Maintenance and Inspection Worksheet (Automated) . . . . . DA Form 5988-E

Transportation Discrepancy Report . . . . . SF 364

Product Quality Deficiency Report . . . . . SF 368

MISCELLANEOUS

The American Society of Mechanical Engineers Abbreviations and Acronyms . . . . . ASME Y14.38-1999

Common Table of Allowances, Army Medical Department Expendable/Durable Items . . . . . CTA 8-100

Common Table of Allowances, Expendable/Durable Items (Except Medical, Class V Repair Parts, and Heraldic Items) . . . . . CTA 50-970

Quality Surveillance for Fuels, Lubricants, and Related Products MIL-STD-3004A1

TRM Shipping and Storage Instructions (access at https://www-tdps.tacom.army.mil/PackingHome.htm) AK15176939

SUPPLY CATALOGS

Standard Automotive Tool Set (SATS) . . . . . SC 4910-95-A81

Tool Kit, General Mechanic's Automotive . . . . . SC 5180-95-B47

TECHNICAL MANUALS

Operator's Manual with Maintenance Repair Parts and Special Tools List for Heavy Expanded Mobility Tactical Truck (HEMTT A2) . . . . . TM 9-2320-325-14&P

Operator's Manual for Palletized Load System Trailer (PLST) M1076 . . . . . TM 9-2330-385-10

Operator’s Manual for Truck, LHS, w/ and w/out Winch, 8 x 8 M1120A2 . . . . . TM 9-2320-424-10

Operator’s Manual for Truck, Tank, 8 x 8 M978. . . . . TM 9-2320-429-10

Operator's Manual for Truck, Tank, 8 x 8 M978A2 w/winch M978A2 w/o winch . . . . . TM 9-2320-348-10

Operator's Manual for Truck, Tank, 8 x 8 M978A4 w/winch M978A4 w/o winch . . . . . TM 9-2320-339-10

Operator’s Manual for Truck, Tractor, M1074 and M1075 PLS . . . . . TM 9-2320-364-10

Operator's, Unit, Direct Support and General Support Maintenance Manual for Lead-Acid Storage Batteries . . . . . TM 9-6140-200-14

Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use . . . . . TM 750-244-6

END OF WORK PACKAGE

OPERATOR AND FIELD MAINTENANCE

MAINTENANCE ALLOCATION CHART (MAC) INTRODUCTION

THE ARMY MAINTENANCE SYSTEM MAC

1. This introduction provides a general explanation of all maintenance and repair functions authorized at the two maintenance levels under the Two-Level Maintenance System concept.
2. This MAC (immediately following the introduction) designates overall authority and responsibility for the performance of maintenance functions on the identified end Item or component. The application of the maintenance functions to the end Item or component shall be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in column (4) as:

   Field — includes two subcolumns, Crew (C) and Maintainer (F).

   Sustainment — includes two subcolumns, Below Depot (H) and Depot (D).
3. The maintenance to be performed at field and sustainment levels is described as follows:
   a. **Crew maintenance.** The responsibility of a using organization to perform maintenance on its assigned equipment. It normally consists of inspecting, servicing, lubricating, adjusting, and replacing parts, minor assemblies, and subassemblies. The replace function for this level of maintenance is indicated by the letter “C” in the third position of the SMR code. A “C” appearing in the fourth position of the SMR code indicates complete repair is possible at the crew maintenance level.
   b. **Maintainer maintenance.** Maintenance accomplished on a component, accessory, assembly, subassembly, plug-in unit, or other portion either on the system or after it is removed. The replace function for this level of maintenance is indicated by the letter “F” appearing in the third position of the SMR code. An “F” appearing in the fourth position of the SMR code indicates complete repair is possible at the field maintenance level. Items are returned to the user after maintenance is performed at this level.
   c. **Below depot sustainment.** Maintenance accomplished on a component, accessory, assembly, subassembly, plug-in unit, or other portion either on the system or after it is removed. The replace function for this level of maintenance is indicated by the letter “H” appearing in the third position of the SMR code. An “H” appearing in the fourth position of the SMR code indicates complete repair is possible at the below depot sustainment maintenance level. Items are returned to the supply system after maintenance is performed at this level.
   d. **Depot sustainment.** Maintenance accomplished on a component, accessory, assembly, subassembly, plug-in unit, or other portion either on the system or after it is removed. The replace function for this level of maintenance is indicated by the letter “D” or “K” appearing in the third position of the SMR code. Depot sustainment maintenance can be performed by either depot personnel or contractor personnel. A “D” or “K” appearing in the fourth position of the SMR code indicates complete repair is possible at the depot sustainment maintenance level. Items are returned to the supply systems after maintenance is performed at this level.
4. The tools and test equipment requirements table (immediately following the MAC) lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from the MAC.
5. The remarks table (immediately following the tools and test equipment requirements) contains supplemental instructions and explanatory notes for a particular maintenance function.

MAINTENANCE FUNCTIONS

Maintenance functions are limited to and defined as follows:

1. **Inspect.** To determine the serviceability of an Item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel). This includes scheduled inspection and gauging and evaluation of cannon tubes.

MAINTENANCE FUNCTIONS – CONTINUED

2. **Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an Item and comparing those characteristics with prescribed standards on a scheduled basis, i.e., load testing of lift devices and hydrostatic testing of pressure hoses.
3. **Service.** Operations required periodically to keep an Item in proper operating condition; e.g., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases. This includes scheduled exercising and purging of recoil mechanisms. The following are examples of service functions:
    a. **Unpack.** To remove from packing box for service or when required for the performance of maintenance operations.
    b. **Repack.** To return Item to packing box after service and other maintenance operations.
    c. **Clean.** To rid the Item of contamination.
    d. **Touch up.** To spot paint scratched or blistered surfaces.
    e. **Mark.** To restore obliterated identification.
4. **Adjust.** To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.
5. **Align.** To adjust specified variable elements of an item to bring about optimum or desired performance.
6. **Calibrate.** To determine and cause corrections to be made or to be adjusted on instruments of test, measuring, and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.
7. **Remove/Install.** To remove and install the same Item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.
8. **Paint (ammunition only).** To prepare and spray color coats of paint so that the ammunition can be identified and protected. The color indicating primary use is applied, preferably, to the entire exterior surface as the background color of the item. Other markings are to be repainted as original so as to retain proper ammunition identification.
9. **Replace.** To remove an unserviceable Item and install a serviceable counterpart in its place. “Replace” is authorized by the MAC and assigned maintenance level is shown as the third position code of the Source, Maintenance and Recoverability (SMR) code.
10. **Repair.** The application of the maintenance services, including fault location/troubleshooting, removal/installation, disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.
11. The following definitions are applicable to the “repair” maintenance function:.
    a. **Services.** Inspect, test, service, adjust, align, calibrate, and/or replace.
    b. **Fault location/troubleshooting.** The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or Unit Under Test (UUT).
    c. **Disassembly/assembly.** The step-by-step breakdown (taking apart) of a spare/functional group coded Item to the level of its least component, that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).
    d. **Actions.** Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.
12. **Overhaul.** That maintenance effort (service/action) prescribed to restore an Item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

MAINTENANCE FUNCTIONS – CONTINUED

13. **Rebuild.** Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (e.g., hours/miles) considered in classifying Army equipment/components.

EXPLANATION OF COLUMNS IN THE MAC

1. **Column (1) Group Number.** Column (1) lists Functional Group Code (FGC) numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the Next Higher Assembly (NHA).
2. **Column (2) Component/Assembly.** Column (2) contains the Item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.
3. **Column (3) Maintenance Function.** Column (3) lists the functions to be performed on the Item listed in column (2). (For a detailed explanation of these functions refer to “Maintenance Functions” outlined above).
4. **Column (4) Maintenance Level.** Column (4) specifies each level of maintenance authorized to perform each function listed in column (3), by indicating work time required (expressed as manhours in whole hours or decimals) in the appropriate subcolumn. This work time figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance levels, appropriate work time figures are to be shown for each level. The work time figure represents the average time required to restore an Item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the MAC.
5. The symbol designations for the various maintenance levels are as follows:

Field
C . . . . . Crew maintenance
F . . . . . Maintainer maintenance
Sustainment
L . . . . . Specialized Repair Activity (SRA)
H . . . . . Below depot maintenance
D . . . . . Depot maintenance

NOTE

The “L” maintenance level is not included in column (4) of the MAC. Functions to this level of maintenance are identified by work time figure in the “H” column of column (4), and an associated reference code is used in the REMARKS column (6). This code is keyed to the remarks and the SRA complete repair application is explained there.

6. **Column (5) Tools and Equipment Reference Code.** Column (5) specifies, by code, those common tool sets (not individual tools), common Test, Measurement and Diagnostic Equipment (TMDE), and special tools, special TMDE and special support equipment required to perform the designated function. Codes are keyed to the entries in the tools and test equipment table.
7. **Column (6) Remarks Code.** When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks table entries.

EXPLANATION OF COLUMNS IN THE TOOLS AND TEST EQUIPMENT REQUIREMENTS

1. **Column (1) – Tool or Test Equipment Reference Code.** The tool or test equipment reference code correlates with a code used in Column (5) of the MAC.
2. **Column (2) – Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.
3. **Column (3) – Nomenclature.** Name or identification of the tool or test equipment.
4. **Column (4) – National Stock Number (NSN).** The NSN of the tool or test equipment.
5. **Column (5) – Tool Number.** The manufacturer's part number.

EXPLANATION OF THE COLUMNS IN THE REMARKS

1. **Column (1) – Remarks Code.** The code recorded in column (6) of the MAC.
2. **Column (2) – Remarks.** This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

END OF WORK PACKAGE

OPERATOR AND FIELD MAINTENANCE

MAINTENANCE ALLOCATION CHART (MAC)

Table 1. Maintenance Allocation Chart (MAC) for MFS Tank Rack Module.

(1)	(2)	(3)	(4)				(5)	(6)
			FIELD		SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	CREW	MAINTAINER	BELOW DEPOT	DEPOT	TOOLS AND EQUIPMENT REF CODE	REMARKS CODE
			C	F	H	D		
00	**MFS TANK ASSEMBLY**							
01	**ISO TANK RACK**	Inspect	0.5					A
		Replace			6.0		5,6	C
		Repair			10.0		5,6	C
0101	Manhole Cover	Inspect	0.2					A
		Repair		0.5			5,6	
0102	Hose Trough Assembly	Inspect	0.2					A
		Replace		2.0			6	
		Repair		2.0			5,6	B
0103	Ladder and Brackets	Inspect	0.2					A
		Replace		0.5			6	
010301	ISO Rack Ladders	Inspect	0.5					A
		Replace		0.1			6	
0104	ISO Rack Handles	Inspect	0.2					A
		Replace		0.3			6	
0105	ISO Rack Placards	Inspect	0.2					A
		Replace		0.1			6	
0106	Tool Box	Inspect	0.2					A
		Replace		1.5			5,6	
		Repair		1.5			5,6	B
0107	Static Ground Reels	Inspect	0.2					A
		Test		0.2				
		Replace		0.1			6	
0108	Ground Rod	Inspect	0.2					A
		Replace		0.3			6	
010801	Tank Ground Strap	Inspect	0.2					
		Replace		0.1			6	
0109	Compression Springs	Inspect	0.2					A
		Replace		2.5			2,6,8	
0110	Data Plates and Brackets	Inspect	0.2					A
		Replace		0.2			5,6	
0111	Rollers	Inspect	0.2					A
		Replace	0.2					
0112	Fire Extinguishers and Brackets	Inspect	0.2					A
		Replace		0.2			6	

Table 1. Maintenance Allocation Chart (MAC) for Modular Fuel System Tank Rack Module - Continued.

(1)	(2)	(3)	(4)				(5)	(6)
			FIELD		SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	CREW	MAINTAINER	BELOW DEPOT	DEPOT	TOOLS AND EQUIPMENT REF CODE	REMARKS CODE
			C	F	H	D		
01	**ISO TANK RACK - CONTINUED**							
011201	Drip Pan Bracket	Inspect	0.2					A
		Replace		0.4			6	
0113	Batteries	Inspect	0.2					A
		Service		0.5			6	
		Replace		1.0			6	
011301	Battery Cables	Inspect	0.2	0.5			6	A
		Replace		0.4			5,6	
011302	Battery Box	Inspect	0.2					A
		Replace		1.2			5,6	
011303	Battery Box Lid	Inspect	0.2					A
		Remove/Install	0.1					
0114	Battery Charger	Inspect	0.2					A
		Replace		1.5			6	
0115	NATO Slave Connector	Inspect	0.2					A
		Replace		0.3			6	
011501	NATO Slave Base Grommet	Replace		0.3			6	
02	**TANK ASSEMBLY**	Inspect	0.5	0.5				A
		Replace			6.0		5,6	C
		Repair			10.0		5,6	C
0201	Tank Cover Plate	Inspect	0.2					A
		Replace		0.2			6	
0202	Rear Head Tank Gauge	Inspect	0.2					A
		Replace		0.1			6	
020201	Rear Head Tank Gauge Pointer	Inspect	0.2					A
		Adjust		0.1			6	
		Replace		0.3			6	
		Repair		0.3			6	B
0203	Front and Rear Drain Hoses	Inspect	0.2					A
		Replace		1.0			6	
0204	Vent Valve Assembly	Inspect	0.2					A
		Replace		2.0			6	
		Repair		2.0			6	B
0205	Vapor Recovery Piping Assembly	Inspect	0.2					A
		Replace		0.5			6	
		Repair		0.5			6	B

Table 1. Maintenance Allocation Chart (MAC) for Modular Fuel System Tank Rack Module - Continued.

(1)	(2)	(3)	(4)				(5)	(6)
			FIELD		SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	CREW	MAINTAINER	BELOW DEPOT	DEPOT	TOOLS AND EQUIPMENT REF CODE	REMARKS CODE
			C	F	H	D		
02	**TANK ASSEMBLY - CONTINUED**							
0206	Liquid Level Switch	Inspect Replace	0.2	 1.0			 5,6	A
0207	Isolation Mounts	Inspect		0.2				A
0208	Stowage Tube Assembly	Inspect Replace Repair	0.2	 0.3 0.3			 4,6 4,6	A B
03	**DISCHARGE PIPING ASSEMBLY**	Inspect Replace Repair	0.2	 1.3 1.3			 5,6,7 5,6,7	A B
0301	Port C Plug and Vacuum Breaker	Inspect Replace	0.2	 0.1			 6	A
0302	Discharge Piping Assembly Butterfly Valve	Inspect Replace Repair	0.2	 1.5 1.5			 5,6,7 5,6,7	A B
030201	Discharge Piping Assembly Butterfly Valve Lever	Inspect Replace	0.2	 0.1			 6	A
0303	Left or Right Hand Discharge Arm	Inspect Replace Repair	0.2	 2.0 2.0			 5,6 5,6	A B
030301	1 in. (2.54 cm) Discharge Fuel Hose	Inspect	0.2					A
030302	2 in. (5.08 cm) Discharge Fuel Hose	Inspect	0.2					A
030303	Non-Valved Dry Break Coupling Assembly	Inspect Replace Repair	0.2	 0.2 0.5			 3,5,6 3,5,6	A B
0304	Fuel Pump Assembly	Inspect Service Replace	0.2	 0.2 1.0			 6	A

Table 1. Maintenance Allocation Chart (MAC) for Modular Fuel System Tank Rack Module - Continued.

(1)	(2)	(3)	(4)				(5)	(6)
			FIELD		SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	CREW	MAINTAINER	BELOW DEPOT	DEPOT	TOOLS AND EQUIPMENT REF CODE	REMARKS CODE
			C	F	H	D		
03	**DISCHARGE PIPING ASSEMBLY - CONTINUED**							
030401	Fuel Pump Assembly	Inspect	0.2					A
		Test		0.1				
	Switch	Replace		0.5			6	
030402	Fuel Pump Assembly Wiring Harness	Inspect	0.2					A
		Replace		1.0			5	
030403	Fuel Pump Assembly Circuit Breaker	Test		0.1				
		Replace		0.2			5	
04	**BOTTOM LOAD VALVE PIPING ASSEMBLY**	Inspect	0.2					A
		Replace		1.5			5,6,7	
		Repair		1.5			5,6,7	B
0401	Port B Vacuum Breaker	Inspect	0.2					A
		Replace		0.2			6	
0402	Precheck Valve	Inspect	0.2					A
		Replace		0.3			5,6	
0403	Quick Disconnect Coupling Half	Inspect	0.2					A
		Replace		0.5			6	
0404	Inlet Piping Assembly	Inspect	0.2					A
		Replace		4.5			5,6,7	
		Repair		4.5			5,6,7	B
040401	Inlet Piping Assembly Butterfly Valve Lever	Inspect	0.2					A
		Replace		0.1			6	
05	**V2 VALVE**	Inspect	0.2					A
		Replace		3.5			1,5,6,7	
06	**V1 VALVE**	Inspect	0.2					A
		Replace		2.3			3,5,6,7	
0601	V1 Valve Fusible Link	Inspect	0.2					
		Replace		0.8			3,6	

Table 1. Maintenance Allocation Chart (MAC) for Modular Fuel System Tank Rack Module - Continued.

(1)	(2)	(3)	(4)				(5)	(6)
			FIELD		SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	CREW C	MAINTAINER F	BELOW DEPOT H	DEPOT D	TOOLS AND EQUIPMENT REF CODE	REMARKS CODE
07	**CONTROL LEVER ASSEMBLY (V1)**	Inspect	0.2					A
		Replace		3.5			6	
		Repair		3.5			6	B
08	**SIDE MECHANICAL OPERATOR CONTROL LEVER (V2)**	Inspect	0.2					A
		Replace		1.3			6	
09	**CABLE GUIDES**							
0901	V1 Valve Cable Guide	Inspect	0.2					A
		Replace		0.5			4,5,6	
0902	V2 Valve Cable Guide	Inspect	0.2					A
		Replace		0.6			4,5,6	
0903	Left Hand Emergency Stop Cable Guide	Inspect	0.2					A
		Replace		1.5			4,5,6	
0904	Right Hand Emergency Stop Cable Guide	Inspect	0.2					
		Replace		1.5			4,5,6	A
0905	V1 and V2 Emergency Stop Cable Guide	Inspect	0.2					A
		Replace		1.5			4,5,6	
10	**MISC ITEMS**							
1001	Discharge Hose	Inspect	0.2					A
		Replace		0.3			3,5,6	
		Repair		0.3			3,5,6	B
1002	Suction Hose	Inspect	0.2					A
		Replace		0.2				
		Repair		0.2				B
1003	Nozzle Assembly with Valved Dry Break Coupling	Inspect	0.2					A
		Replace		0.5			3,5,6	
		Repair		0.5			3,5,6	B
1004	Camlock Adapter	Inspect	0.2					A
		Replace		1.5			6,7	
		Repair		1.5			6,7	B
100401	Camlock Adapter Bracket	Inspect	0.2					
		Replace		0.2			6	

Table 1. Maintenance Allocation Chart (MAC) for Modular Fuel System Tank Rack Module - Continued.

(1)	(2)	(3)	(4)				(5)	(6)
			FIELD		SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	CREW	MAINTAINER	BELOW DEPOT	DEPOT	TOOLS AND EQUIPMENT REF CODE	REMARKS CODE
			C	F	H	D		
10	**MISC ITEMS - CONTINUED**							
1005	Tee Assembly	Inspect	0.2					A
		Replace		2.0			5,6,7	
		Repair		2.0			5,6,7	B
100501	Tee Assembly Bracket	Inspect	0.2					A
		Replace		0.1			6	
1006	Fuel System Coupling and Dust Cap Gaskets	Inspect	0.2					A
		Replace	0.3					
1007	Flange Adapter Assembly	Inspect	0.2					A
		Replace		0.2			6	
		Repair		0.2			6	

Table 2. Tools and Test Equipment for MFS Tank Rack Module.

(1) TOOLS OR TEST EQUIPMENT	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL STOCK NUMBER	(5) TOOL NUMBER
1	F	3/4 in. crowfoot attachment, socket wrench, 3/8 in. drive	5120-01-335-1155	FC024A
2	F	15/16 in. crowfoot attachment, socket wrench, 3/8 in. drive	5120-01-335-1090	FC030A
3	F	Single diameter hand tool	5120-00-469-7607	64CGMP
4	F	Splice compression tool	5120-01-496-8168	3632T13
5	F	Standard automotive tool set (SATS)	4910-01-490-6453	SC 4910-95-A81
6	F	Tool kit, general mechanic's	5180-01-483-0249	SC 5180-95-B47
7	F	Wrench, torque, 0-175 lb-ft	5120-01-396-5937	1753LDF
8	F	Wrench, torque, 120-600 lb-ft	5120-01-474-5098	QD4600

Table 3. Remarks for MFS Tank Rack Module.

Remark Code	Remark
A	Crew/operator inspection limited to Preventive Maintenance Checks and Services (PMCS).
B	Repair to consist of replacement of parts only at Field Level Maintenance.
C	Complete repair at Specialized Repair Activity (SRA).

END OF WORK PACKAGE

OPERATOR AND FIELD MAINTENANCE

COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS

Scope, General, Explanation of Columns, Components of End Item (COEI) and Basic Issue Items (BII) Lists

SCOPE

This work package lists COEI and BII for the Modular Fuel System Tank Rack Module (MFS TRM) to help you inventory Items for safe and efficient operation of the equipment.

GENERAL

The COEI and BII information is divided into the following lists:

1. **Components of End Item (COEI).** This list is for information purposes only and is not authority to requisition replacements. These Items are part of the MFS TRM. As part of the end Item, these Items must be with the end Item whenever it is issued or transferred between property accounts. Items of COEI are removed and separately packaged for transportation or shipment only when necessary. Illustrations are furnished to help you find and identify the Items.
2. **Basic Issue Items (BII).** These essential Items are required to place the MFS TRM in operation, operate it, and to do emergency repairs. Although shipped separately packaged, BII must be with the MFS TRM during operation and when it is transferred between property accounts. Listing these Items is your authority to request/requisition them for replacement based on authorization of the end Item by the TOE/MTOE. Illustrations are furnished to help you find and identify the Items.

EXPLANATION OF COLUMNS

1. **Column (1) Illus Number.** Gives you the number of the Item illustrated.
2. **Column (2) National Stock Number (NSN).** Identifies the stock number of the Item to be used for requisitioning purposes.
3. **Column (3) Description, Part Number/(CAGEC).** Identifies the Federal Item name (in all capital letters) followed by a minimum description when needed. The stowage location of COEI and BII is also included in this column. The last line below the description is the part number and the Commercial and Government Entity Code (CAGEC) (in parentheses).
4. **Column (4) Usable On Code.** When applicable, gives you a code if the Item you need is not the same for different models of equipment.
5. **Column (5) U/I.** Unit of Issue (U/I) indicates the physical measurement or count of the Item as issued per the National Stock Number shown in column (2).
6. **Column (6) Qty Rqr.** Indicates the quantity required.

COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS

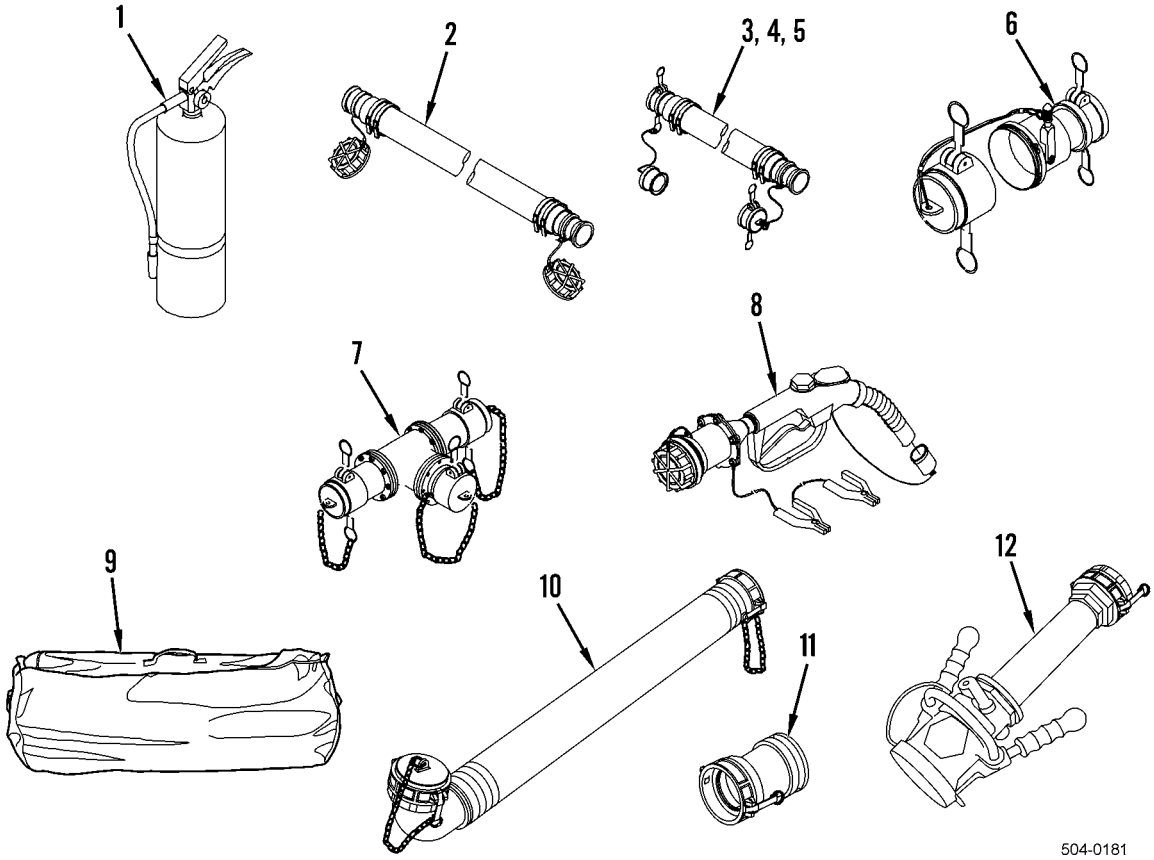

Table 1. Components of End Item (COEI).

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, PART NUMBER/(CAGEC)	(4) USABLE ON CODE	(5) U/I	(6) QTY RQR
1	4210-00-965-1108	Fire extinguisher dry chemical (hand portable) AA393-A2D (58536)		EA	2
2	4720-01-582-7881	Hose, discharge, 2 in. x 13 ft 5251747 (80195)		EA	2
3	4720-01-582-7865	Hose, discharge, 4 in. x 15 ft 6001538 (80195)		EA	2
4	4720-01-582-8153	Hose, discharge, 4 in. x 8 ft, 3 in. 6001882 (80195)		EA	1
5	4720-01-582-8171	Hose, discharge, 4 in. x 6 ft, 2 in. 6001903 (80195)		EA	1
6	4730-01-582-7846	Camlock adapter 5251391 (80195)		EA	1
7	4930-01-582-7894	Tee assembly 5251206 (80195)		EA	1
8	4930-01-582-7514	Nozzle assembly 300ALMM 200 ANAJ (41592)		EA	1
9	4235-01-582-7903	Kit, fuel spill control KIT423 (1JA49)		EA	1
10	4720-01-582-7975	Hose, discharge, 3 in. x 3.5 ft 6001908 (80195)		EA	1
11	4730-00-951-3296	Reducer, quick disconnect, 4 to 3 in. AA59326A/12-5-A-1 (58536)		EA	1
12		Flange adapter assembly Consisting of:			
	4730-01-582-7910	Adapter flange assembly 5251624 (80195)		EA	1
	4930-01-483-8060	Nozzle, fuel and oil servicing 20170407J (86184)		EA	1
	5331-01-111-2802	O-ring AS568-151 (81343)		EA	1
	5305-01-451-9220	Screw, cap, hexagon head 92865A542 (39428)		EA	6
	5310-01-083-1540	Washer, flat 0120388 (80195)		EA	6
	5310-01-083-0799	Washer, lock 0120380 (80195)		EA	6

COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS – CONTINUED

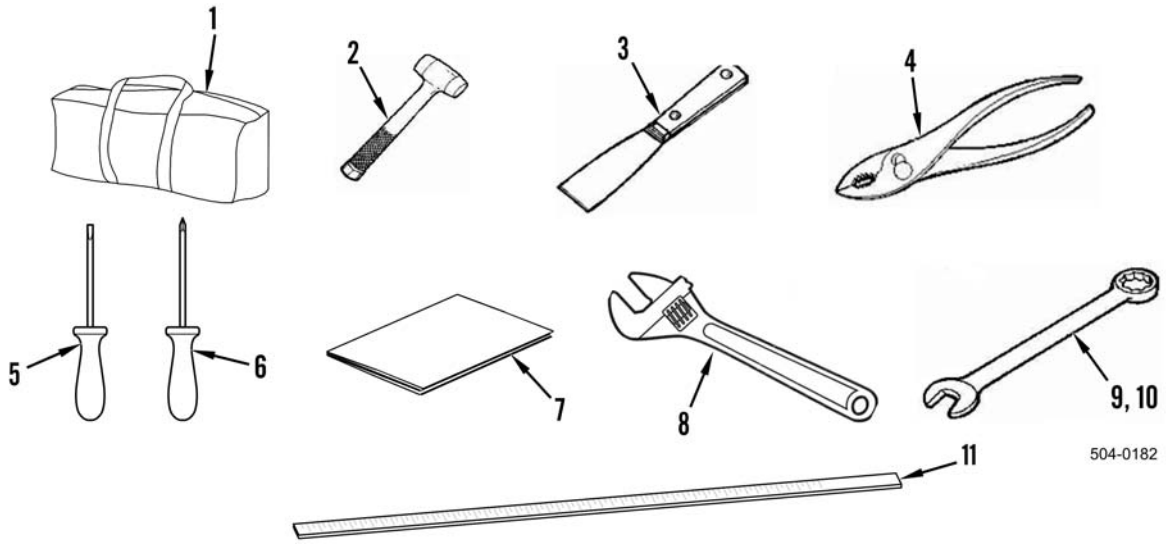

Table 2. Basic Issue Items (BII).

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, PART NUMBER/(CAGEC)	(4) USABLE ON CODE	(5) U/I	(6) QTY RQR
1	5140-00-473-6256	Bag, tool 11655979 (34623)		EA	1
2	5120-01-065-9037	Hammer, hand soft plastic head 69-533 (08292)		EA	1
3	5120-00-221-1536	Knife, putty 1-1/4 in. blade 5120-00-221-1536 (72896)		EA	1
4	5120-00-223-7397	Pliers, slip joint 8 in. B107.23 (80204)		PR	1
5	5120-00-222-8852	Screwdriver, flat tip 1/4 in. B107.15 (05047)		EA	1
6	5120-00-234-8913	Screwdriver, cross tip #2 B107.30 (050407)		EA	1
7		Technical manual, TM 10-4930-365-13&P		EA	1
8	5120-00-264-3796	Wrench, adjustable 12 in. B107.8 (05047)		EA	1

COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS – CONTINUED

Table 2. Basic Issue Items (BII) - Continued.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, PART NUMBER/(CAGEC)	(4) USABLE ON CODE	(5) U/I	(6) QTY RQR
9	5120-01-429-7388	Wrench, box and open end 9/16 in. SOEX18 (55719)		EA	1
10	5120-01-429-7383	Wrench, box and open end 1/2 in. SOEX16 (55719)		EA	1
11	6680-01-582-7535	Gauge stick 5252235 (80195)		EA	1

END OF WORK PACKAGE

OPERATOR AND FIELD MAINTENANCE

EXPENDABLE AND DURABLE ITEMS LIST
Scope, Explanation of Columns in Expendable/Durable Items List

SCOPE

This work package lists expendable and durable Items that you will need to operate and maintain the Modular Fuel System Tank Rack Module (MFS TRM). This list is for information only and is not authority to requisition the listed Items. These Items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V Repair Parts, and Heraldic Items), CTA 50-909, Field and Garrison Furnishings and Equipment or CTA 8-100, Army Medical Department Expendable/Durable Items.

EXPLANATION OF COLUMNS IN EXPENDABLE/DURABLE ITEMS LIST

1. **Column (1) Item No.** This number is assigned to the entry in the list and is referenced in the narrative instructions to identify the Item (e.g., Grease, automotive and artillery, GAA (WP 0153, Item 8)).
2. **Column (2) Level.** This column identifies the lowest level of maintenance that requires the listed Item (C = Crew, F = Maintainer).
3. **Column (3) National Stock Number (NSN).** This is the NSN assigned to the Item which you can use to requisition it.
4. **Column (4) Item Name, Description, Part Number/(CAGEC).** This column provides the other information you need to identify the Item. The last line below the description is the part number and the Commercial and Government Entity Code (CAGEC) (in parentheses).
5. **Column (5) U/I.** Unit of Issue (U/I) code shows the physical measurement or count of an Item, such as gallon, dozen, gross, etc.

Table 1. Expendable and Durable Items List.

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER (NSN)	(4) ITEM NAME, DESCRIPTION, PART NUMBER (CAGEC)	(5) U/I
1	C	8415-00-634-5023	Apron, utility 021-758 (15481)	EA
2	C	6850-01-474-2302	Cleaning compound, solvent MIL-PRF-680 (81349)	GL
3	C	7930-01-350-7034	Cleaning compound, solvent-detergent CITRIKLEEN 1850 (56883)	CN
4	F	5330-00-246-0330	Cloth, abrasive aluminum oxide, 320 grit, 9 x 11 in. ANSI B74.18 (80204)	PG
5	C	7920-00-044-9281	Cloth, cleaning MIRACLEWIPEL001 (51200)	BX
6	C	8415-00-266-8675	Gloves, rubber, industrial MIL-DTL-32066 (81349)	PR
7	C	4240-00-203-3804	Goggles, industrial ANSI Z87.1 (80204)	PR

Table 1. Expendable and Durable Items List - Continued.

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER (NSN)	(4) ITEM NAME, DESCRIPTION, PART NUMBER (CAGEC)	(5) U/I
8	C	9150-01-197-7689	Grease, automotive and artillery, GAA MIL-PRF-10924-D (81349)	CN
9	F	9150-01-117-2928	Grease, ball and roller bearing DOD-G-24508 (81349) 5 pound can	CN
10	C	9150-01-234-2193	Grease, general purpose LUBRIPLATE 105-TUBE (73219) 10 ounce tube	TB
11		8030-01-137-6964	Loctite sealant 515 (05972) 51531	
12	C	9150-00-189-6727	Oil, lubricating, OE/HDO-10 MIL-PRF 2104-G (81349) 1 quart can	QT
13	C	9150-00-402-4478	Oil, lubricating, OEA-30 Arctic MIL-L-46167 (891349) 1 quart can	QT
14	C	4940-01-504-5273	Pan, drip, 6.5 gal. capacity 101020 (00P07) 10 per package	PG
15	F	9150-00-250-0926	Petrolatum, technical 14P1 (82146) 1.75 pound can	CN
16	F	4240-01-269-4169	Respirator, air filtering 313000 (39SU9)	EA
17	F	8030-01-479-0487	Sealing compound 56541 (05972) 250 ml tube	TU
18	C	5975-01-507-0451	Strap, tiedown electrical components PLT2S (06383)	EA
19	C	4920-01-558-0931	Tape, teflon 6802K44 (07BY4) 0.75 in. wide, 0.003 in. thick	EA
20	C	6810-00-682-6867	Water, distilled ASTM D 1193 Type III (81346) reagent, gal. bottle, 6 per box	BX

END OF WORK PACKAGE

OPERATOR AND FIELD MAINTENANCE

MANDATORY REPLACEMENT PARTS LIST

INTRODUCTION

This work package includes a list of all mandatory replacement parts referenced in the task initial setups and procedures. These are Items that must be replaced during maintenance whether they have failed or not. This includes Items based on usage intervals such as miles, time, rounds fired, etc.

Table 1. Mandatory Replacement Parts List (MRPL).

ITEM NO.	PART NUMBER/ (CAGEC)	NATIONAL STOCK NUMBER (NSN)	NOMENCLATURE	QTY
1	21050A (13226)	5920-01-562-8032	Fusible link	1
2	5251117 (80195)		Gasket	1
3	10232E (55242)	5330-01-535-6103	Gasket	8
4	6000071 (80195)	5330-01-566-8357	Gasket-3, flange	4
5	10233C (13226)		Gasket-4, flange	6
6	1-1/4 IN77/75/78T (79154)		Gasket, slide	4
7	10140 (3HMC9)		Gasket, slide	1
8	10232D (55242)	5330-01-535-6104	Gasket-sump, 3 in.	1
9	6603097 (80195)		Gasket, non-asbestos	1
10	6100388 (80195)		Nut, lock, hexagon	10
11	90045A016 (39428)		Nut, lock, hexagon	18
12	90045A018 (39428)		Nut, self-locking, hexagon	4
13	90640A133 (39482)		Nut, self-locking, hexagon	14
14	92501A030 (39428)		Nut, self-locking, hexagon	48
15	9413569 (80195)		Nut, self-locking, hexagon	9
16	M45913-1/4CG5C (81349)	5310-00-088-1251	Nut, self-locking, hexagon	122

Table 1. Mandatory Replacement Parts List (MRPL) - Continued

ITEM NO.	PART NUMBER/ (CAGEC)	NATIONAL STOCK NUMBER (NSN)	NOMENCLATURE	QTY
17	MS35691-37 (96906)	5310-00-834-8734	Nut, self-locking, hexagon	8
18	MS51943-35 (96906)	5310-00-935-9021	Nut, self-locking, hexagon	114
19	6603920 (80195)		O-ring	1
20	6703643 (80195)		O-ring	1
21	901001-90 (59582)		O-ring	1
22	MS24665-353 (80205)	5315-00-839-5822	Pin, cotter	3
23	MS24665-359 (80205)	5315-00-013-7214	Pin, cotter	3
24	AS3209-012 (81343)	5330-01-133-0131	Retainer, packing	1
25	38-106-04-16 (94222)		Rivet	20
26	97525A415 (39428)	5320-01-271-3318	Rivet, blind	18
27	97525A615 (39428)		Rivet, pop	24
28	3458T17 (39428)		Rope, wire	1
29	82499-1800 (0DT23)	4010-01-543-6609	Rope, wire	4
30	220146 (0DT23)	5330-01-433-9203	Seal, plain	10
31	3936T14 (39428)		Sleeve stop	20
32	28-2-G (0DT23)	4030-00-431-5337	Sleeve, swagging, wire rope	8
33	0120380 (80195)	5310-01-083-0799	Washer, lock	20
34	6100459 (80195)		Washer, lock	2
35	91114A031 (39428)	5310-01-357-8847	Washer, lock	19
36	91114A033 (39428)	5310-01-549-2705	Washer, lock	16

Table 1. Mandatory Replacement Parts List (MRPL) - Continued

ITEM NO.	PART NUMBER/ (CAGEC)	NATIONAL STOCK NUMBER (NSN)	NOMENCLATURE	QTY
37	9Q5908 (13226)		Washer, lock	1
38	MS35335-37 (96906)	5310-00-209-5116	Washer, lock	1
39	MS35338-44 (80205)	5310-00-582-5965	Washer, lock	2
40	MS35338-53 (80205)	5310-00-584-7889	Washer, lock	24
41	P49866-11 (65035)	5310-00-637-9541	Washer, lock	10

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RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE Date you filled out this form.
TO: *(Forward to proponent of publication or form) (Include ZIP Code)* U.S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS 1 Rock Island Arsenal, Rock Island, IL 61299-7630	FROM: *(Activity and location) (Include ZIP Code)* Your mailing address	

PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	Title
TM10-4930-365-13&P	28 May 2010	Operator and Field Maintenance Manual Including RPSTL for MFS Tank Rack

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended changes, if possible).
	0017-2					Part Number supplied for item 2 is incorrect.

SAMPLE

**Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	Signature
Your Name		*Your Signature*

DA FORM 2028, FEB 74 REPLACES DA FORM 2028, 1 DEC 68, WHICH WILL BE USED. USAPPC V3.00

TO: (Forward direct to addressee listed in publication)	FROM: (Activity and location) (Include ZIP Code)	DATE
U. S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS 1 Rock Island Arsenal, Rock Island, IL 61299-7630	Your address	Date you filled out this form

PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE
TM10-4930-365-13&P	28 May 2010	Operator & Field Maint Manual w/ RPSTL for MFS Tank Rack

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

SAMPLE

PART III – REMARKS **(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)**

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Your Name		Your Signature

USAPPC V3.00

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS

For use of this form, see AR 25-30; the proponent agency is ODISC4.

Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).

DATE

TO: (Forward to proponent of publication or form)(Include ZIP Code)

U.S. Army TACOM Life Cycle Management Command
ATTN: AMSTA-LCL-MPP/TECH PUBS
1 Rock Island Arsenal, Rock Island, IL 61299-7630

FROM: (Activity and location) (Include ZIP Code)

PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 10-4930-365-13&P	28 May 2010	Operator and Field Maintenance Manual Including RPSTL for MFS Tank Rack

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended changes, if possible).

Reference to line numbers within the paragraph or subparagraph.

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

DA FORM 2028, FEB 74 REPLACES DA FORM 2028, 1 DEC 68, WHICH WILL BE USED. USAPPC V3.00

TO: (Forward direct to addressee listed in publication)	FROM: (Activity and location) (Include ZIP Code)	DATE
U. S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS 1 Rock Island Arsenal, Rock Island, IL 61299-7630		

PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE
TM 10-4930-365-13&P	28 May 2010	Operator & Field Maintenance Manual w/RPSTL for MFS Tank Rack

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III – REMARKS (Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

USAPPC V3.00

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	**DATE**
TO: (Forward to proponent of publication or form) (Include ZIP Code) U. S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS 1 Rock Island Arsenal, Rock Island, IL 61299-7630	**FROM: (Activity and location) (Include ZIP Code)**	

PUBLICATION/FORM NUMBER TM 10-4930-365-13&P	DATE 28 May 2010	TITLE Operator and Field Maintenance Manual Including RPSTL for MFS Tank Rack

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended changes, if possible).

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TO: (Forward direct to addressee listed in publication) U. S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS 1 Rock Island Arsenal, Rock Island, IL 61299-7630	FROM: (Activity and location) (Include ZIP Code)	DATE

PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

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TM 10-4930-365-13&P	28 May 2010	Operator & Field Maintenance Manual Including RPSTL for MFS Tank Rack

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USAPPC V3.00

By Order of the Secretary of the Army:

GEORGE W. CASEY JR.
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
1012001

DISTRIBUTION: To be distributed in accordance with the initial distribution requirements for IDN: 257035, requirements for TM 10-4930-365-13&P.

THE METRIC SYSTEM AND EQUIVALENTS

Linear Measure

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

Weights

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Pounds
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

Liquid Measure

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

Square Measure

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.0386 Sq Miles

Cubic Measure

1 Cu Centimeter = 1,000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

Temperature

5/9 (°F - 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5 C° +32 = F°

APPROXIMATE CONVERSION FACTORS

To Change	To	Multiply By
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Sq Inches	Sq Centimeters	6.451
Sq Feet	Sq Meters	0.093
Sq Yards	Sq Meters	0.836
Sq Miles	Sq Kilometers	2.590
Acres	Sq Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Sq Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

To Change	To	Multiply By
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Sq Centimeters	Sq Inches	0.155
Sq Meters	Sq Feet	10.764
Sq Meters	Sq Yards	1.196
Sq Kilometers	Sq Miles	0.386
Sq Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Sq Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621